

EXAMINING ADOLESCENTS' BELIEFS ABOUT MEDITATION:  
A MIXED METHODS STUDY USING THE REASONED ACTION APPROACH

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Submitted to the faculty of the University Graduate School  
in partial fulfillment of the requirements  
for the degree  
Doctor of Philosophy  
in the School of Public Health  
Indiana University  
June 2017

Accepted by the Graduate Faculty, Indiana University, in partial fulfillment of the requirements for the degree of Doctor of Philosophy.

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Date of Defense: April 21<sup>st</sup>, 2017

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I dedicate my dissertation to my loving wife Katie. Your love and support for me enabled this work to happen. You truly are my greatest teammate.

“Many women do noble things, but you surpass them all.”

-Proverbs 31:29

## **ACKNOWLEDGEMENTS**

First and foremost, I would like to express my utmost appreciation and gratitude for my academic advisor and committee chairperson Dr. David K. Lohrmann who has been a tremendous mentor and support for me during the entire process of my doctoral program. Your guidance, encouragement, and belief in me has proven invaluable. I want to thank you for always having an open door and lending an ear and hand whenever needed. I cannot express how much I appreciate how encouraging you have been and the many unique opportunities you provided for me in order to further my abilities. I truly am grateful for you and the time I was able to spend as your mentee.

I would also like to thank my committee members, Dr. Susan E. Middlestadt, Dr. Jonathon J. Beckmeyer, and Dr. Catherine M. Sherwood-Laughlin for serving on my dissertation committee and always being available when I was in need of extra guidance. I am especially grateful for your willingness to impart your wisdom and knowledge while moving me forward. I know each of you have busy schedules, so I do hope you know how much I appreciate the time you gave me. I never felt that I was alone in completing my doctoral work and dissertation thanks to each of you. Special thanks to both Dr. Beckmeyer and Dr. Middlestadt for your help with the Chapter 4 and Chapter 5 analyses. I felt a bit overwhelmed with these sections, but your specific help was extremely beneficial. I also want to thank Dr. Sherwood-Laughlin for always being an encouraging voice and so supportive of my family. You helped make what could have been a difficult situation much more enjoyable.

I am very grateful for all my professors in both the School of Public Health and the School of Education at Indiana University for your help in preparing me for the dissertation and my future endeavors. I felt as though I was blessed with the best professors the University had to offer. I am also grateful for the Applied Health Science staff, especially Joyce L. Arthur and Annie Campbell for continually asking me how things were going, checking in with how my family was doing, and helping me with any administrative tasks that were needed.

I would also like to thank my daughters Evelyn and Vivian who were both born while completing my doctoral degree. Although you won't remember it, both of you were a tremendous source of joy and love throughout the process. I love you both very deeply and am so thankful for you!

A huge thanks to my wife Katie whose patience, support, love, encouragement, and belief in me is so appreciated. You helped me in more ways than you realize. I am so grateful for you as my teammate and best friend. We did it!

Above all, I would like to thank God who made this all possible. What I was able to accomplish during this time and throughout my life would be impossible without Him. Thank you for bringing me to this place, putting so many wonderful people in my life, for helping me reach my dream of earning a PhD, and for all the things yet to come. I pray that what you have done in me will be used for your purposes.

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Self-regulation is an important capacity for young people to develop in order to improve both health and academic outcomes. Recent research on meditation with adolescents has shown that the behavior can promote self-regulation and positively impact the self-regulatory regions of the adolescent brain. Currently, very few young people meditate and the beliefs held by adolescents about meditation which would be necessary to understand in order to help them adopt the behavior are unknown. The purpose of this study was to examine adolescents' beliefs about meditation and the impact these beliefs have on their intention to meditate. High school students completed questions both open-ended and closed-ended assessing their beliefs about meditation based on constructs from the Reasoned Action Approach (RAA). Multiple regression analysis was conducted to examine the impact attitudes, perceived norm, perceived behavioral control had on their intention to meditate while controlling for demographic variables. A content and frequency analysis was conducted on the open-ended questions to determine the salient or top-of-the-mind beliefs held by adolescents about trying to meditate at least twice in the next week. Attitude and perceived norm were the only two constructs statistically significantly associated with intention to meditate. Students believed that meditation could reduce their stress and help them relax but may take time and could slow them down. Students also believed that their family and friends would approve of them meditating and no one would disapprove. Finally, participants believed

that taking time and limiting distractions would enable them to meditate. Health professionals interested in helping young people acquire the health-enhancing behavior of meditation to promote self-regulation can do so by changing adolescents' attitudes towards the behavior, helping them to see that other youth meditate, and that others would approve of them trying to meditate.

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## TABLE OF CONTENTS

TITLE PAGE	i
ACCEPTANCE PAGE	ii
COPYRIGHT	iii
DEDICATION	iv
ACKNOWLEDGEMENTS	v
ABSTRACT	vii
CHAPTER	
I        INTRODUCTION	
Background of the Problem	1
Statement of the Problem	1
Purpose of the Study	2
Behavior with Action, Context, Target, Time	2
Theoretical Framework	3
Research Questions	3
Importance of the Study	3
Scope of the Study	4
Limitations	5
Definitions of Terms	5
II        REVIEW OF THE LITERATURE	
Introduction	10
Self-regulation and its Development	11
Meditation and Self-regulation in Adolescence	12
Psychological Studies of Meditation and Attention	13
Psychological Studies of Meditation and Emotion	14
Neuroscientific Studies of Meditation	15
Determinants of Meditation	16
Meditation Determinants in Interventions	17
RAA: Origins, History, Constructs, Utility	18
RAA Survey Design	19
III        RESEARCH METHODS	
Introduction	21
Research Design	22
Setting	22
Participants	22
Instrumentation	22
Procedures	26

	Quantitative Data Processing and Analysis	27
	Qualitative Data Processing and Analysis	29
	Ethical Considerations	31
	Summary	31
IV	MANUSCRIPT 1	
	Abstract	32
	Background	33
	Methods	34
	Results	39
	Discussion	41
	Implications for School Health	44
	References	46
V	MANUSCRIPT 2	
	Abstract	51
	Introduction	52
	Methods	55
	Results	59
	Discussion	64
	Implications for Practice	67
	References	69
	REFERENCES	76
	APPENDICES	
A	EVIDENCE TABLES	86
B	STUDY INFORMATION SHEET	123
C	INSTRUMENT	124
D	IRB APPROVAL DOCUMENT	135
E	SCHOOL APPROVAL LETTER	137
F	GRADUATE SCHOOL GRANT LETTER	138
G	SCHOOL OF PUBLIC HEALTH GRANT LETTER	139
H	CODING MANUAL	140
I	DEFENSE: SUPPLEMENTAL HANDOUT	146
	CURRICULUM VITA	

## **Chapter 1: Introduction**

### *Background of the Problem*

Adolescence can be viewed as a period of ‘storm and stress’(Hall, 1904) or a window of opportunity for positive development (Steinberg, 2014). The challenges that plague youth include stress, risk-taking behavior, peer and media influence, poor dietary choices and lack of physical activity leading to obesity, and high rates of psychopathology (Steinberg, 2014). Successfully navigating these challenges requires youth to develop the capacity to self-regulate thoughts, feelings, and behavior (Giedd, 2008; Moilanen, 2007). As of late, one practice has emerged as a promising strategy to enhance self-regulation and to positively impact key regions of the brain responsible for self-control: Meditation (Lyons & DeLange, 2016; Wisner, Jones, & Gwin, 2010). Recent research has shown that meditation promotes both cognitive control and emotion regulation, integral components of self-regulation that can enhance functioning and connectivity within the Pre-Frontal Cortex (PFC) and Anterior Cingulate Cortex (ACC). These are key regions of the self-regulatory network in the brain (Broderick, 2013; Broderick & Metz, 2009; Tang et al., 2010; Urry, Roeser, Lazar, & Poey, 2012; Xue, Tang, & Posner, 2011).

### *Statement of the Problem*

Currently, only approximately 1.6% of youth ages 4-17 in the United States practice any form of meditation (Black, Clark, Barnes, Stussman, & Nahin, 2015). Although the positive effects of meditation on youth self-regulation are emerging, no studies to date have investigated the determinants of meditation, or their intentions to

meditate, for adolescents which are critically important to understand when helping individuals adopt a health behavior (Glasgow & Linnan, 2008)

### *Purpose of the Study*

The purpose of this study was to explore the belief determinants of meditation intention for adolescents by examining the salient, top-of-the-mind beliefs held by adolescents ages 14-18 about meditating at least twice in the next week.

### *Behavior with Action, Context, Target, and Time*

Meditation is defined by the National Center for Complementary and Integrative Health (NCCIH) as having four main components: A quiet location, a comfortable posture, a focus of attention, and an open/non-judgmental attitude towards distractions (NCCIH, 2007). This definition was used because of its general description of meditation and the reputable source, namely the NCCIH. Specifically, the action used for this study is trying meditation or focusing the attention on a word/phrase or the sensations of the breath which is used in various forms of meditation. Because so few young people use meditation (Black et al., 2015), the assumption is that most youth will be trying meditation and, therefore, the time was limited to at least two times during the next week. The context (quiet place) and target (comfortably seated) were used because they are both typical of various forms of meditation and are necessary for individuals first trying meditation. Finally, the priority population of adolescents ages 14-18 was chosen because of the need for young people in this age group to adopt behaviors such as meditation to help them acquire skills and capacities for self-regulation (Steinberg, 2014).

### *Theoretical Framework*

The current study is based on the Reasoned Action Approach (RAA). The RAA's theoretical constructs focus on individual motivational factors as determinants or influences on the likelihood of executing a specific behavior. The main assumption of RAA is that individuals' intentions to engage in a behavior are the strongest predictor of actually enacting a behavior (Fishbein & Ajzen, 2010). Behavioral intentions are the result of three factors: attitude towards the behavior, perceived norm regarding the behavior, and perceived behavioral control (Fishbein & Ajzen, 2010). Attitude refers to evaluations of a behavior as either good or bad and/or enjoyable or unenjoyable. Perceived norm refers to viewing important others as approving of the behavior or not and/or thinking that others like the individual engage in the behavior or not. Finally, perceived behavioral control refers to perceiving whether or not the behavior is under the individual's control and/or a person's self-efficacy regarding the behavior (Fishbein & Ajzen, 2010).

### *Research Questions*

1. Are attitude, perceived norm, and perceived behavioral control associated with intentions of adolescents ages 14-18 to try meditating at least twice in the next week?
2. What are the salient, top-of-the-mind beliefs held by adolescents ages 14-18, about trying to meditate at least twice during the next week?

### *Importance of the Study*

Over the past few years, the link between self-regulation and meditation among adolescents has become more clearly established (Lyons & DeLange, 2016). However, little is known about youth's beliefs underlying their decision to meditate. Understanding

a population's beliefs concerning a certain behavior provides a great deal of information regarding their decision to execute the behavior or not (Fishbein & Ajzen, 2010).

Knowledge of a behavior's determinants for a given population is crucial for effective intervention design (Glasgow & Linnan, 2008). Therefore, if health professionals working with adolescents aim to increase the number of young people trying meditation, the factors that influence them to meditate must be determined. The intention of this study is to begin to fill this current knowledge gap.

### *Scope of the Study*

Problems that can at least be partly attributed to low self-control affect many young people and include (but are not limited to) the following: approximately 27% of teenagers in the United States experience high stress during the school year and at comparable levels to adults (American Psychological Association [APA], 2014); one in four or five youth in the United States meets diagnostic criteria for a mental disorder with severe impairment across the lifetime (Merikangas et al., 2010); over the past 30 years obesity rates have more than doubled in children and quadrupled in adolescents (Ogden, Carroll, Kit, & Flegal, 2014); approximately 32.8% of teenagers consume alcohol; 21.7% use marijuana; and 30.1% are currently sexually active (Centers for Disease Control and Prevention [CDC], 2016).

Meditation has been shown to improve self-regulation among adolescents (Broderick & Metz, 2009; Metz et al., 2013; Tang et al., 2010; Tang et al., 2007; Xue et al., 2011). The practice, specifically Mindfulness Meditation, has been used as a means to reduce stress, enhance academic performance, and promote well-being within diverse adolescent settings including schools (Zenner, Hermleben-Kurz, & Walach, 2014) and in

special need populations including those with learning and mental disorders (Bogels, Hoogstad, van Dun, de Schutter, & Restifo, 2008; Weijer-Bergsma, Formsma, Bruin, & Bogels, 2011). Currently only a small percentage (1.6%) of youth in the United States use any form of meditation (Black et al., 2015).

### *Limitations*

The current study has several limitations. The sample used in this study came from one high school and, therefore, results from this study are unlikely to be generalizable to the entire adolescent population of the United States. The sample was small, and although a smaller sample size is necessary for a salient belief elicitation (Fishbein & Ajzen, 2010), this limits the ability to generalize the findings. Lastly, although the instrument was pilot tested, developed for use in a previous study (Lederer & Middlestadt, 2014) and was established using procedures for developing RAA measures (Fishbein & Ajzen, 2010), it has yet to undergo additional validity tests.

### *Definitions of Terms*

Adolescence- The period in an individual's life that spans from age 10 to age 25 (Steinberg, 2014).

Anterior Cingulate Cortex (ACC)- A region of the brain located just behind the Pre-Frontal Cortex that integrates inputs from diverse brain regions in order to regulate responses and guide behavior. The ACC is considered to be the center of the brain's self-regulatory system (Kelly et al., 2009).

Pre-Frontal Cortex (PFC)- A region of the brain located just behind the forehead and is involved with tasks such as self-awareness, judgment, decision-making, complex planning, and problem solving (Bear, Connors, & Paradiso, 2007).

Functional Connectivity (FC)- The relationship between brain separate brain regions that work together in an integrated capacity (Kelly et al., 2009).

Diffusion Tensor Imaging (DTI)- A neuroimaging technique used to measure white matter tracts in the brain (Tang et al., 2010).

Functional Magnetic Resonance Imaging (fMRI)- A neuroimaging technique used to measure brain activity associated with changes in blood flow to brain regions (Urry et al., 2012).

Self-Regulation- The ability to flexibly activate, be aware of, prevent, persevere and/or modify one's attention, emotions, cognitive strategies, and behavior in response to direction from internal cues, environmental feedback for the purpose of attaining personally relevant goals (Moilanen, 2007).

Meditation- Meditation is generally seen as a health behavior consisting of four core elements: A quiet location with as few distractions as possible; a specific, comfortable posture (sitting, lying down, walking, or in other positions); a focus of attention (a specially chosen word or set of words, an object, or the sensations of the breath); and an open attitude (letting distractions come and go naturally without judging them). Meditation can take various forms, including mindfulness, transcendental, movement, mantra, and spiritual meditation. For some, meditation is a religious or spiritual practice; for others it is a wellness practice (NCCIH, 2007).

Mindfulness- Paying attention in a particular way: On purpose, in the present moment, and non-judgmentally (Kabat-Zinn, 1994).



Integrative Body-Mind Training (IBMT)- A type of meditation developed in the 1990's that stresses a balanced state of relaxation while focusing attention.

Thought control is achieved through the gradual process of posture and relaxation (Tang et al., 2007).

Reasoned Action Approach (RAA)- A general behavior theory that suggests an individual's behavior is primarily determined by his or her intention to perform a behavior. Intention is influenced by three global constructs which include attitude towards the behavior, perceived norm, and perceived behavioral control or self-efficacy (Fishbein & Ajzen, 2010).

Action- A component of identifying a behavior while using the RAA defined as the activity taking place while carrying out the behavior (Fishbein, 2008).

Context- A component of identifying a behavior while using the RAA defined as the conditions under which the behavior is being performed (Fishbein, 2008).

Target- A component of identifying a behavior while using the RAA defined as the direction towards which the behavior is being pursued (Fishbein, 2008).

Time- A component of identifying a behavior while using the RAA defined as the period in which the behavior is being performed (Fishbein, 2008).

Theory of Planned Behavior (TPB)- A precursor theory to RAA that used a framework for understanding, predicting, and changing human behavior similar to RAA including behavioral intention, attitude, subjective norm, perceived behavioral control (Ajzen, 2013).

Social Cognitive Theory (SCT)- A health behavior theory whose core determinants include knowledge, perceived self-efficacy, outcome expectations,

goals, perceived facilitators, and social and structural impediments (Bandura, 2004)

Salient Belief Elicitation- A qualitative method used in behavioral research to identify potential belief determinants (Middlestadt, Bhattacharyya, Rosenbaum, Fishbein, & Shepherd, 1996).

Top-of-the-mind- Most notable, important, or readily available.

Intention- A construct from the Reasoned Action Approach (RAA), which asserts that the most significant determinant of behavior is a person's aim or plan to perform that behavior (Fishbein & Ajzen, 2010).

Attitude- A construct from the RAA regarding a person's evaluations about a behavior as being positive or negative (instrumental) and/or enjoyable or unenjoyable (experiential); principally determined by an individual's beliefs about the outcomes associated with performing the behavior (behavioral beliefs) (Fishbein & Ajzen, 2010).

Perceived Norm- A construct from the RAA regarding a person's perceptions about whether others think one should engage in the behavior or not and whether or not those that are considered similar engage in the behavior; principally determined by a person's normative beliefs, which include whether important referent individuals approve or disapprove of performing the behavior (Fishbein & Ajzen, 2010).

Perceived Behavioral Control- A construct from the RAA regarding a person's perceptions about whether or not executing the behavior is under their control or up to them and their self-efficacy or confidence in their ability to perform the

behavior; principally determined by control beliefs focusing on the presence or absence of facilitators and barriers to behavioral performance (Fishbein & Ajzen, 2010).

Self-Efficacy- A construct from SCT which is an individual's confidence in his or her ability to exercise control over a behavior (Bandura, 2004).

## **Chapter 2: Review of the Literature**

### *Introduction*

Researchers, health professionals, and developmental specialists are shifting their view of adolescence as a time of ‘storm and stress’ (Hall, 1904), to a potential window of opportunity for positive and healthy development (Romeo, 2010; Steinberg, 2014). This paradigm shift is due, at least in part, to a new understanding of brain plasticity during adolescence (Giedd, 2008). Adolescents’ brains are remarkably malleable in response to experience making this an opportune time in life for positive development, but also a vulnerable time with respect to detrimental life outcomes (Romeo, 2010).

Youth in America face a range of challenges during adolescence. Young people experience stress at comparable levels to adults (APA, 2014); face increased propensity for risk taking behaviors such as alcohol and drug use (National Center on Addiction and Substance Abuse [CASA], 2011; Steinberg, 2009), along with sexual risk behaviors (Tolman & McClelland, 2011); are more susceptible to peer influence (Brown & Larson, 2009); and are bombarded with media messages promoting unhealthy behaviors (Brown & Bobkowski, 2011). Adolescents also face challenges related to food choices and physical activity as obesity rates over the past 30 years have quadrupled among this population (Ogden et al., 2014). Epidemiologic research has identified adolescence as the time of typical onset of psychopathology and suggests that one in every four or five young people meet criteria for a mental disorder with severe impairment (Costello, Egger, & Angold, 2005; Merikangas et al., 2010).

Successfully transforming these challenges into positive outcomes requires youth to develop the capacity and skills of self-regulation (Moilanen, 2007). *Self-regulation*

can be defined as the ability to control thoughts, emotions, and behaviors for the purpose of achieving personally relevant goals (Moilanen, 2007; Posner & Rothbart, 2000).

Developmental scientists believe that the ability to self-regulate is the most important factor for life success (Steinberg, 2014) because it is associated with a variety of positive outcomes in adulthood such as health, wealth, and good social standing (Moffitt et al., 2011), and that understanding self-regulation is the most crucial goal for growing in our knowledge of both development and psychopathology because poor self-regulation is associated with a variety of mental illnesses (Posner & Rothbart, 2000).

### *Self-regulation and its development in adolescence*

Self-regulation plays a central role in both positive health and academic achievement for young people. The development of regulatory capacities may reduce risk-taking and associated negative consequence. For example, youth self-regulation abilities are associated with less substance use and sexual risk behaviors (Raffaelli & Crockett, 2003; Wills & Dishion, 2004; Wills, Sandy, & Yaeger, 2002). Academically, self-regulated learners produce higher achievement (Zimmerman, 2000a, 2000b). Self-discipline has been shown to be a better predictor of academic achievement than intelligence (Duckworth & Seligman, 2005) and those who lack self-control tend to underperform academically and are more likely to exhibit problem behavior in school (Wulfert, Block, SantaAna, Rodriguez, & Colman, 2002). Finally, longitudinal research has demonstrated that youth from age 3 to 11 who scored higher on measures of self-regulation predicted better physical health, reduced substance dependence, increased personal finances, and lower criminal offenses in adulthood even after controlling for intelligence, social class, and family background (Moffitt et al., 2011).

The capacity to self-regulate develops across the lifespan and is particularly plastic during the adolescent years (Steinberg, 2014). A potential underlying factor for this malleability is the development of a key region of the brain integral for self-regulation known as the Anterior Cingulate Cortex (ACC) (Margulies et al., 2007). The ACC is the center of the brain's self-regulatory system as it serves as a hub for information processing, integration, and regulation. The ACC has strong connections with both the cortical region (such as the Prefrontal Cortex (PFC), which is important for judgment and decision-making) and the subcortical region (such as the limbic system where emotional processing takes place). Recent brain-imaging research has revealed the critical role of the ACC in attention (cognitive control) and emotion regulation, both of which play vital roles in self-regulation. This research also demonstrated that Functional Connectivity (FC) (the effectiveness of communication among brain regions) between the ACC and other brain regions becomes more efficient as young people progress through adolescence and into adulthood (Kelly et al., 2009; Margulies et al., 2007).

#### *Meditation and self-regulation in adolescence*

A critical task for those working with youth is the necessity of promoting behaviors known to enhance self-regulation during the window of opportunity of adolescence for the goal of positive youth development. Meditation is considered a mind-body practice, which involves a quiet location, a comfortable posture, and a focus of attention for a duration of time (NCCIH, 2007). That meditation, specifically Mindfulness Meditation (MM), has been shown to improve self-regulation in adults (Allen et al., 2012) is well established and has recently been investigated in adolescent populations (Erbe & Lohrmann, 2016).

### *Psychological studies of meditation and attention*

Meditation, by nature, is a form of attention training (Davidson et al., 2012; Tang et al., 2007). Two recent studies involving adolescents with Attention Deficit-Hyperactivity Disorder (ADHD) used MM programs, to test if they could reduce attention problems within this population. Although the sample sizes were small (14 and 8 respectively), participants attention problems improved after completing the programs (Bogels et al., 2008; Weijer-Bergsma et al., 2011).

A second form of meditation known as concentrative meditation, specifically Transcendental Meditation (TM), was examined to understand its effect on alerting attention, orienting attention, and attending to goal conflicts. Adolescents in two schools in India, one of which trained students in TM, and the other that did not, were compared using the Attention Network Test (ANT). This test measures three aspects of attention: alerting (i.e., reaching and maintaining an attentive state), orienting (i.e., focusing on relevant incoming information while disregarding distractions), and conflict monitoring (i.e., focusing in competing tasks while resolving discrepancies between goals and action). Students from the school that used TM scored significantly higher on the conflict-monitoring portion of the ANT (Bajjal, Jha, Kiyonaga, Singh, & Srinivasan, 2011).

Zoogman and colleagues (2014) recently conducted a meta-analysis of 20 MM studies involving youth ages 18 and younger. The overall effect size was statistically significant and in the small to moderate range pointing to subjects in the MM condition as showing greater improvements on outcomes compared to those in the control conditions. The authors noted that measures of mindfulness and attention explicitly

showed significant improvements for the meditation programs (Zoogman, Goldberg, Hoyt, & Miller, 2014).

*Psychological studies of meditation and emotion regulation*

Several studies of meditation in adolescents have investigated the impact of meditation on emotion regulation. Two studies, a pilot and follow-up, examined the ‘Learning to Breathe’ curriculum which uses MM as a core component. Both studies used a non-randomized treatment and control group design with pre- and post-tests. In both studies, the treatment group experienced a significant improvement in emotion regulation as measured by the Difficulty in Emotion Regulation Scale (DERS) when compared to the control group. In the second study, the treatment group showed a significant improvement in their overall self-regulation efficacy as measured by the Affective Self-Regulatory Efficacy Scale (ASRES) (Broderick & Metz, 2009; Metz et al., 2013).

Schonert-Reichl and Lawlor (2010) tested the effect of the Mindfulness in Education Program, which includes MM as a core component using a non-randomized treatment and control group design with six program classrooms (N=139) and a control group (N=107). Teachers in the intervention group rated students as more attentive and emotionally regulated than did teachers in the control group. The treatment group also demonstrated a statistically significant positive trend for positive affect (Schonert-Reichl & Lawlor, 2010).

Using a group of incarcerated males, Barnert and associates (2014) examined the effect of a ten-week meditation program that used MM on self-regulation. The sample size was small (N=29) and the researchers used a mixed-method design. Following



treatment, participants increased their self-regulation, specifically regulation of emotion. Qualitative interviews revealed a theme of increased self-discipline as a result of the intervention (Barnert, Himelstein, Herbert, Garcia-Romeu, & Chamberlain, 2014).

#### *Neuroscientific studies of meditation*

Studies showing evidence of meditation's ability to positively affect key regions of the brain involved with self-regulation have used samples of college undergraduates. One such study used 27 American undergraduates ages 18-21. The researchers used a cross-sectional design with Functional Magnetic Resonance Imaging (fMRI) and a psychological measure of positive and negative affect. Meditation was measured by frequency of use and did not specify the type. Results of this study revealed an association between higher levels of activation in the left lateral pre-frontal cortex (LLPFC) and dorsal medial prefrontal cortex (DMPFC) while regulating positive emotions. Also, activation in the LLPFC and DMPFC while regulating positive emotions was associated with higher reported positive affect (Urry et al., 2012).

A series of studies used a form of meditation known as Integrative Body-Mind Training (IBMT), which is a type of training developed from Chinese medicine whose core component is MM. Each of these studies used a randomized control trial (RCT) design with college undergraduates. The treatment groups experienced IBMT for either five days or one month and were compared to a control group who received comparable levels of relaxation training. The instruments included psychological measures of positive or negative affect and neuroimaging techniques such as electroencephalogram (EEG), Single Photon Emission Computed Tomography (SPECT), Diffusion Tensor Imaging (DTI), and fMRI scans. The researchers were specifically interested in how

meditation could promote self-regulation and positively impact the ACC (Tang, Lu, Feng, Tang, & Posner, 2015; Tang et al., 2010; Tang et al., 2009; Tang et al., 2007; Xue et al., 2011).

The results of this series of studies revealed a variety of positive effects of meditation related to self-regulation and the ACC. Psychological improvements in conflict resolution and self-regulation of emotion were both found in the treatment group but not the control group. Neurological improvements included increased EEG power in theta frequency related to the ACC (an indicator of greater activity in the ACC), more regional blood flow in the right ACC and left insula (a marker of enhanced activation in the ACC), increased white matter in the ACC (an indicator of greater or strengthened connections between the ACC and other brain regions), and increased nodal efficiency in the left ACC (a marker of brain network connectivity and efficiency). Each of these improvements was significant for the treatment group but not the control group (Tang, Lu, Fan, Yang, & Posner, 2012; Tang et al., 2015; Tang et al., 2010; Tang et al., 2009; Tang et al., 2007; Xue et al., 2011).

#### *Determinants of meditation*

Although researchers have begun to establish that engaging in meditation can improve adolescents' self-regulation capacities, they have not identified the determinants of adolescent meditation. Because the determinants of a behavior help us to understand motivational factors that lead to performance of a behavior, effective intervention design is critically dependent on knowledge of the determinants of a given behavior (Glasgow & Linnan, 2008). At this time, the determinants of meditation for adolescents are unknown.

A few studies, however, have been conducted using young and older adults. For example, Williams and colleagues (2011) studied the caregivers of cancer patients and identified attitude (i.e., preferring to accomplish something rather than meditating) and perceived behavioral control (i.e., not knowing much about meditation and not being able to stop thoughts barriers to meditation. In a belief elicitation study, Lederer & Middlestadt (2014) identified three global constructs, based on RAA, related to college students and university staff intentions to mediate. Participants reported that they would be more likely to meditate if they had more time and family and friends approved, but they would be less likely to mediate due to having other things to do. Finally, stress reduction was the most commonly cited benefit and the time commitment the most commonly cited disadvantage of mediation (Lederer & Middlestadt, 2014).

*Meditation determinants addressed in interventions*

Sharma (2001) conducted a study evaluating the effectiveness of an intervention aimed at addressing meditation determinants. The intervention used processes to improve participants' meditation self-efficacy, a construct from Social Cognitive Theory, which is similar to perceived behavioral control of the TPB and the RAA. A total of 31 participants ages 21 to 68 completed a six-week yoga and meditation course consisting of six 75-minute sessions. Those enrolled in the courses were provided with detailed instructions on how to practice meditation at home. As the intervention progressed, the at-home practice instructions were reviewed and other forms of meditation were taught with opportunities to practice. Participants were encouraged to continue daily self-practice. At the conclusion of the study, past week yoga-related behaviors such as meditation significantly increased from pre-test to post-test as did meditation self-

efficacy, which increased from a pre-test mean of 1.19 to a post-test mean of 8.10 (p-value=.0001) (Sharma, 2013).

*Reasoned Action Approach: Origins, history, constructs, and utility*

The RAA has its origins in the Theory of Reasoned Action (TRA), which was developed by Martin Fishbein to improve understanding of the relationships between attitudes, intentions, and behaviors (Montano & Kasprzyk, 2008). Fishbein was able to demonstrate that attitude towards a behavior is a far superior predictor of the behavior than attitude towards an object related to the behavior (Montano & Kasprzyk, 2008). Fishbein and Icek Ajzen later identified the constructs of Attitudes, Perceived Norm, and Perceived Behavioral Control, and clearly identified beliefs underlying these constructs along with their measurement (Montano & Kasprzyk, 2008). As part of this identification, they laid out a major step in using the theory as identifying four components of a behavior: Action, Target, Context, and Time. With the addition of Perceived Behavioral Control, the theory became known as the TPB. Further, the TPB's constructs were broken down into instrumental and experiential attitude, injunctive and descriptive norms, and capacity and autonomy behavioral control, at which point the theory became known as the RAA (Montano & Kasprzyk, 2008).

The RAA's theoretical constructs focus on individual motivational factors as determinants or influences on the likelihood of executing a specific behavior. The main assumption of RAA is that individuals' intentions to engage in a behavior are the strongest predictor of actually enacting a behavior (Fishbein & Ajzen, 2010). Behavioral intentions are the result of three factors: attitude towards the behavior, perceived norm regarding the behavior, and perceived behavioral control (Fishbein & Ajzen, 2010).

Attitude is defined as an individual's evaluations about a behavior as being positive or negative and/or enjoyable or unenjoyable and is based on beliefs about the prominent consequences of engaging in a particular behavior. Perceived norm refers to an individual's perceptions about whether others think one should engage in the behavior or not and whether or not those that are considered similar engage in the behavior.

Perceived norm is based on beliefs about what immediate social referents think about the person performing a behavior. Finally, perceived behavioral control is defined as a person's perceptions about whether or not executing the behavior is under their control or up to them along with their self-efficacy or confidence in their ability to perform the behavior and is influenced by beliefs about the salient circumstances that enable or prevent a behavior (Fishbein & Ajzen, 2010).

Two meta-analyses using the TPB and the RAA have shown its usefulness in predicting both intention and behavior. The meta-analysis focusing on the TPB included over 200 studies that focused on a variety of behaviors. The authors concluded that prospective tests of the TPB provide strong predictions of both intention and behaviors across a range of health behaviors in both adult and youth populations (McEachan, Conner, Taylor, & Lawton, 2011). A second meta-analysis of the RAA that examined studies not used in the previous meta-analysis (N=74) further demonstrated that constructs from the RAA are able to predict both intention and behavior within adult and youth populations alike (McEachan et al., 2016).

#### *Reasoned Action Approach survey design*

Fishbein and Ajzen (2010) provide recommendations for designing surveys using the RAA. To elicit salient beliefs, it is recommended that six open-ended questions be

used, two for each construct of the theory. Consequences are elicited by asking what good or bad things might happen if the behavior is performed. Social referents are elicited by asking what one or two people might support or disapprove of engaging in the behavior. Finally, control beliefs are elicited by asking what might make performing the behavior easier or harder (Fishbein & Ajzen, 2010).

To assess associations with intention, Fishbein and Ajzen (2010) recommend using 5-point semantic differential response option scales. Two to four items could be used to measure intention with examples such as ‘using the behavior is likely/unlikely’ or ‘I will use the behavior, strongly agree/strongly disagree. Instrumental attitude can be assessed by items such as asking if the behavior is wise/foolish or healthy/unhealthy. Experiential attitude can be assessed by asking if the behavior is pleasant/unpleasant or enjoyable/unenjoyable. Injunctive norm can be assessed by asking if most people important to the participant would approve of them using the behavior, strongly agree/strongly disagree. Descriptive norm can be assessed by asking if most people like the participant use the behavior, strongly agree/strongly disagree. Capacity can be assessed by asking how confident the person is in performing the behavior, completely confident/not at all confident. Finally, autonomy can be assessed by asking if performing the behavior is under the participants control, under my control/not under my control (Fishbein & Ajzen, 2010).

### **Chapter 3: Research Methods**

#### *Introduction*

Self-regulation is a critical capacity for adolescents to develop in order to successfully navigate the myriad of challenges facing them during a critical time in development, in order to lead a healthy and successful adult life (Moffitt et al., 2011; Steinberg, 2014). Meditation is a health behavior that has been shown to stimulate the growth of self-control, specifically attention and emotion regulation, within adolescent populations (Broderick & Metz, 2009; Metz et al., 2013; Zoogman et al., 2014). This is likely to occur through improving the functioning and connectivity of brain regions such as the PFC and ACC, which are integral components of the brain's self-regulatory network (Tang et al., 2010; Urry et al., 2012; Xue et al., 2011).

The exploration of determinants of meditation practice is in a nascent stage with only a few studies attempting to identify barriers and influences on a person's meditation usage. Two studies describe the development of the DMPI and the utilization of this tool to identify barriers of meditation practice within a cancer caregiver population (Williams, Dixon, McCorkle, & Van Ness, 2011; Williams, Van Ness, Dixon, & McCorkle, 2012). A third study used the RAA through a salient belief elicitation to examine determinants of meditation practice in a university setting (Lederer & Middlestadt, 2014). Although the aforementioned studies included some adolescents, no research to date has investigated the determinants of meditation practice among younger adolescents, ages 14-18, although some researchers have described the need for such a study (Erbe & Lohrmann, 2016).

### *Research Design*

The current study used a cross-sectional mixed-method design. In order to identify adolescents' beliefs about meditation, students ages 14-18 attending one high school in upstate New York (N=135) completed a salient belief elicitation survey based on the RAA. The survey instrument consisted of quantitative scales and open-ended questions.

### *Setting*

The setting was one public high school in Binghamton, NY. Two health teachers at the high school volunteered access to students in each of their health classes as participants in the current study. Participants watched a video describing meditation in the classroom and took the web-based survey on laptop computers.

### *Participants*

The sample included students from one public high school in Binghamton, NY (N=135). Participants ranged in age (14-18) and were diverse in terms of other demographic characteristics including race, sex, and socio-economic status.

### *Instrumentation*

The instrument used in this study was adapted from an instrument used in a previous salient belief elicitation study examining meditation beliefs (Lederer & Middlestadt, 2014). The instrument was developed using the procedures and validation process recommended by the creators of the RAA (Fishbein & Ajzen, 2010) and was pilot tested with 15 high school students (mean age=16) to confirm timing, understandability, and feasibility. Slight modifications were made and the revised instrument was converted into Qualtrics (Provo, Utah, 2002), a web-based survey



program. The survey begins with an informed consent statement and consists of 60 questions with 6 sections: (1) open-ended questions to elicit salient beliefs, (2) questions assessing self-regulation based on the Adolescent Self-Regulation Inventory (ASRI), (3) closed-ended questions measuring RAA global constructs, (4) questions assessing meditation practice, (5) questions assessing experienced meditators practice, and (6) items related to demographic and other participant characteristics including gender (male, female, other), age (14-18), race/ethnicity (White/Caucasian, Black/African American, Latino or Hispanic, Asian or Asian American, Multi-racial, other), family structure (who the participant lives with either biological parents, just mother, just father, mother and step-father, father and step-mother, grandmother, grandfather, or other relatives, or foster parents), and parent education (did mom or dad graduate from college) that will be used for descriptive statistics and for control variables. The survey took students no longer than 15 minutes to complete (Appendix B).

The RAA variables are for the behavior of “trying to meditate at least twice in the next week.” The behavior referred to meditation broadly given the subjective nature of meditation, its numerous forms (mindfulness, transcendental, spiritual, etc.), and in an effort to reach the widest possible audience. To ensure participants understood the study definition of meditation a brief 8.5-minute video was shown that displayed various ideas people have about meditation, a definition given by the National Center for Complementary and Integrative Health, a guided 1-minute meditation experience, myths about meditation, and examples of smart phone applications that people use to meditate. Following the video and prior to taking the survey the subsequent description from the National Center for Complementary and Integrative Health was provided:

For the purposes of this study, meditation is defined as consisting of the following: Going to a quiet location with as few distractions as possible; sitting in a comfortable posture; focusing attention on a given point (sensations of the breath or a word/phrase) for a few minutes; having an open attitude (letting distractions come and go naturally without judging them) (NCCIH, 2007).

**Salient beliefs.** Six open-ended questions elicited salient beliefs: Two about consequences (ie, “What are one or two good things that might happen if you meditate at least twice in the next week?” and “What are one or two bad things that might happen...?”), two about social referents (ie, “What one or two people might support you if you meditate at twice in the next week?” and “Who, which people or groups, might disapprove of you.....?”), and two about circumstances (ie, “What one or two things might make it easier for you to meditate at least twice in the next week?” and “What one or two things might make it hard for you....?”). Participants were asked to list 1 or 2 salient, top-of-the mind responses for each question.

**Intention, attitude, perceived norm, and perceived behavioral control.**

Closed-ended RAA constructs were assessed with items using a 5-point semantic differential response option scales. Four items measured intention: (1) “My trying to meditate at least twice in the next week is [*likely/unlikely*]”, (2) “I will meditate at least twice in the next week [*strongly agree/strongly disagree*]”, (3) “I am willing to try to meditate at least twice in the next week [*not at all true for me/very true for me*]”, and (4) “How many days in the next week do you intend to meditate [*0-7*].” Attitude was assessed by 5 items: “My trying to meditate at least twice in the next week is [(1) *good/bad*; (2) *enjoyable/unenjoyable*; (3) *wise/foolish*; (4) *fun/boring*; (5) *helpful/unhelpful*].” Perceived norm was assessed with 4 items: (1) “Most people who

are important to me think I should try to meditate at least twice in the next week [*strongly agree/strongly disagree*].”; (2) “My friends and family think I should try to meditate at least twice in the next week [*strongly agree/strongly disagree*].”; (3) “Most people like me will try to meditate at least twice in the next week [*strongly agree/strongly disagree*].”; and (4) “How many people similar to you meditate at least twice a week? [*virtually all/almost none*].” Perceived behavioral control was measured with 4 items: (1, 2) “My trying to meditate at least twice in the next week is [*under my control/not under my control; up to me/not up to me*].”; (3) “How confident are you that you can try to meditate at twice in the next week? [*completely confident/not at all confident*].”; and (4) “How sure are you that you can try to meditate at least twice in the next week? [*very sure/not at all sure*].”

**Demographics.** The RAA also suggests that external variables play a role in influencing beliefs about a behavior and were therefore assessed and used as control variables in this study. Sex was assessed by asking if the participant was male, female, or other. Age was assessed by asking the participants age between 14-18. The participants race/ethnicity was assessed by asking whether the participant was White/Caucasian, Black/African American, Latino or Hispanic, Asian or Asian American, Multi-racial, or other. Family structure was assessed by asking who the participant lives with, either biological parents, just mother, just father, mother and step-father, father and step-mother, grandmother, grandfather, or other relatives, or foster parents. Finally, parent education was assessed by asking if either mom or dad graduated from college (yes, no, or I don’t know).

**Self-regulation.** Self-regulation was measured as a control variable because, although the RAA measures perceived behavioral control, the items used to measure the construct are behavior specific. Self-regulation is an important developmental ability and may differentiate intenders from non-intenders. Self-regulation was measured using the ASRI, which includes questions such as *“I can start a new task even if I’m already tired”* and *“I lose control whenever I don’t get my way”*, measured by a 5-point scale ranging from *“Not at all true for me”* to *“Very true for me”*. The ASRI demonstrated sufficient concurrent and construct validity in a previous study (Moilanen, 2007), and was used in the current study as a control variable by using the average score from all 27 items. Higher scores on the ASRI mean greater self-regulation.

### *Procedures*

The study was approved by the institutional review board at Indiana University (protocol number: 1609327054). Students at a high school in Upstate NY were recruited by contacting a health teacher at the school and formal approval was received from a district superintendent. After formal approval was received, the original health teacher who was contacted, along with a second health teacher at the high school, volunteered to ask their students to participate in the study. A monetary reward was given to the school following completion of the survey.

Because meditation is subjective in nature, can be defined in many ways, and many forms exist, a brief description of meditation including an opportunity to practice meditation was provided via video to participants. Students then completed the survey through the web-based survey program Qualtrics (Provo, Utah, 2002). Inclusion criteria

were adolescents between ages 14-18 and being a student in one of the health classes at the high school.

### *Quantitative Data Processing and Analysis*

Quantitative data collected via Qualtrics were exported into SPSS version 22.0 (IBM, Armonk, New York). Participant responses were scanned for missing values and straight-lining. Three participants were removed due to straight-lining many responses and two participants were removed for excessive missing data. Several self-regulation questions were reverse coded along with one intention and two perceived norm questions. The following demographic questions were recoded into 'yes or no' for ease of analysis: Sex (Sex\_Male or Sex\_Female), Age (14-18), Race/Ethnicity (Race\_White, Race\_Black, Race\_Latino, Race\_Asian, Race\_Multi, Race\_Other), Family Structure (FamStruct\_Bio, FamStruct\_Mother, FamStruct\_Father, FamStruct\_Mother\_StepFather, FamStruct\_Father\_StepMother, FamStruct\_Grandparents, FamStruct\_Foster), and Parent Education (Mom\_Educ and Father\_Educ). To account for other missing data, proportional averages (PA) were used for the Dependent Variable (DV) Independent Variables (IV's), and Self-Regulation, which included intention (3 of 4), attitude (4 of 5), perceived norm (3 of 4), and perceived behavioral Control (3 of 4) and self-regulation (20 of 27). PA uses the average score of the completed items of the construct and imputes and average score for the missing value. Listwise deletion was then used to account for individuals without a valid score (missing 2 or more for DV and IV's and 8 or more for self-regulation), thereby eliminating 15 participants (11.5% missing data). The final analytical sample was N=115.

The items for intention, attitude, perceived norm, perceived behavioral control, and self-regulation were then averaged separately to create a combined scale for each construct. Reliability analyses confirmed a 4-item measure for intention (Cronbach's  $\alpha = .890$ ), a 5-item measure of attitude (Cronbach's  $\alpha = .926$ ), a 4-item measure of perceived norm (Cronbach's  $\alpha = .752$ ), a 4-item measure of perceived behavioral control (Cronbach's  $\alpha = .813$ ), and a 27-item measure of self-regulation (Cronbach's  $\alpha = .814$ ). Frequencies were calculated for all demographic variables along with means, standard deviations, and correlations for all continuous variables. To address the first research question, multiple regression analysis was performed to determine which constructs had the greatest weight and association with intention to meditate while controlling for age, gender, race/ethnicity, family structure, parent education, and self-regulation.

Several assumptions of regression were evaluated. It was unnecessary to evaluate the assumption of independence due to the design of the study being that individual participants all responded to questions themselves. A power analysis was conducted to assure that an adequate sample size was used. An anticipated effect size ( $f^2$ ) of .15, a desired statistical power of 0.8, number of predictors of 9, and a probability level of 0.05 were all used, resulting in a minimum required sample size of 113. Homogeneity of variance (homoscedasticity of residuals) was tested by Levene's test of equality of error variances which resulted in a p-value of 0.265 which indicated there is no significant difference from an equality of variance across the various conditions of this experiment, thereby satisfying this condition. Normality, linearity, and absence of outliers were tested by examining skewness and kurtosis which both of which had measures lower than the standard error (-.402 vs. SE of .226 and -.296 vs. SE of .447) along with

Kolmogorov-Smirnov and Shapiro-Wilks tests of normality both of which had p-values above .05 (.200 and .051 respectively) indicating no evidence of significant deviation from normality for the residuals which was confirmed by observing the Normality Q-Q plot. Finally, singularity and multicollinearity were assessed by examining the Variance Inflation Factor (VIF). VIF's of the Independent Variables (ATT=2.387, PN=1.951, and PBC=2.462) were all under the threshold of four which has been indicated as a cutoff point (Pan & Jackson, 2008). All regression assumptions were met.

#### *Qualitative Data Processing and Analysis*

Quantitative data collected via Qualtrics were exported into an excel spreadsheet for analysis. Participant responses were scanned for missing values and straight-lining. One participant was removed due to excessive missing data while a second participant was removed due to unrealistic responses. Four participants were removed due to missing three or more responses to the demographic questions. The final analytical sample was N=129.

To address the second research question, thematic and frequency analyses of the open-ended questions were used to determine specific beliefs associated with each construct from the RAA. A content analysis was conducted of the responses to the open-ended questions to create categories of similar responses. The text from Qualtrics was downloaded verbatim to an excel file. Responses were reviewed verbatim and grouped by consequences (advantages and disadvantages of meditation), referents (people who approve and disapprove of meditation), and circumstances (what makes it easy and hard to meditate). Progressively, the most frequently mentioned words or phrases were moved to the top of the excel file and used as the label for the category. Coding procedures were

created to identify ten to fifteen codes of common responses for each open-ended question. A team of researchers with experience in using the RAA examined each category and suggested combining a few. These categories were combined and reviewed.

After each category was reviewed and agreed upon by the team, an independent coding of the data was conducted. To establish reliability, a subset of responses (68 for advantages/disadvantages, approve and disapprove, easier and harder or 25% of the data) was randomly selected and was coded by the PI and a second team member. Interrater agreement with a second researcher using the kappa statistic was used to assess the reliability of the coding. The subsequent kappa statistic for each construct yielded a high level of reliability (.956 for positive consequences, .833 for negative consequences, .926 for supporters, 1.000 for disapprovers, .943 for easy circumstances, and 1.000 for hard circumstances) (Landis & Koch, 1977).

After the categories and sub-categories were created along with establishing sufficient reliability, the raw data from the original excel file was combined with a series of mentioned/not mentioned variables corresponding to each created code. These variables were coded 1 for a student if he or she had mentioned an item in the specific code or left blank if the student did not mention anything in that particular code. This coding process set-up the frequency analysis.

The resultant dataset included the responses to the close-ended demographic questions for each participant and the series of variables (1 or blank) that represented codes for advantages, disadvantages, approving referents, disapproving referents, facilitating circumstances, and hindering circumstances. The frequency analysis involved calculating totals for each code and determining which were mentioned most often.



### *Ethical Considerations*

Participants involved in the current study were protected in every way possible. Students completed an online survey using software that enables anonymous responses to questions. Only the researchers conducting this study had access to participants' responses to surveys. All responses were maintained on a password-protected computer to which only the researchers have access.

### *Summary*

The current study is a salient belief elicitation using the RAA to determine adolescents' ages 14-18 beliefs about meditation and will use a cross-sectional mixed methods design. Participants were students from one high school in Binghamton, NY (N=135). The instrument used in this study consists of both quantitative and qualitative measures developed using constructs from the RAA. Multiple regression was used to analyze quantitative data and a thematic and frequency analysis was used to analyze qualitative data.

## **CHAPTER 4: MANUSCRIPT 1**

### **Examining Determinants of Adolescents' Intention to Meditate:**

#### **A Reasoned Action Approach**

##### **ABSTRACT**

**BACKGROUND:** Recent research has shown meditation can promote adolescent self-regulation, an important ability linked to health and academic outcomes. However, few adolescents meditate and their beliefs about meditation are unknown. This study's purpose was to determine if adolescents' attitudes, perceived norm, and self-efficacy regarding meditation were associated with their intentions to try meditating at least twice in the next week.

**METHODS:** A diverse, convenience high school student sample (N=115) reported a) if they would try to meditate at least twice in the next week, b) attitudes towards meditation, c) perceived norm regarding meditation, and d) perceived behavioral control over meditation. Multiple regression was used to determine if attitudes, perceived social norms, and perceived behavioral control regarding meditation were associated with intentions to meditate.

**RESULTS:** Attitude and perceived norm were significantly associated ( $p < .001$ ) with intentions to meditate; but perceived behavioral control was not. Specifically, the more participants perceived meditation to be enjoyable and healthy, along with having an increased perception that others would approve of them meditating and that people like them meditate, the more likely they were to intend to try meditating.

**CONCLUSIONS:** In order to promote adolescents' intentions to meditate, a focus on their attitudes towards meditation and perceptions of their peers meditating appear to be

important. Specifically, helping adolescents see meditation as enjoyable, healthy, and normative, is an important step in helping them try meditation.

## **BACKGROUND**

Previously, researchers have found that adolescents benefit from engaging in meditation.<sup>1-4</sup> Specifically, meditation has been shown to improve psychological symptoms, reduce stress, enhance cognitive performance and attention, and promote resilience. Despite those benefits, very few adolescents meditate. For example, in the National Health Interview Survey only 1.6% of 4 to 17 year olds used any type of meditation in the past 12 months.<sup>5</sup>

Due to their access to a vast majority of youth in the U.S., schools are uniquely positioned to both encourage adolescents to meditate and benefit from adolescents' increased use of meditation. Schools may benefit when students engage in meditation because of its associations with self-regulation.<sup>4</sup> Adolescents who meditate appear to have better attention and emotional regulation,<sup>6-10</sup> meditation appears to activate regions of the brain (e.g., the pre-frontal and the anterior cingulate cortex) important for self-regulation.<sup>11-13</sup> Adolescent self-regulation abilities are associated with being less likely to develop mental disorders<sup>14</sup>, experiencing less stress<sup>15</sup>, engaging in fewer health-risk behaviors,<sup>6-8</sup> less misbehavior in school,<sup>16</sup> and better academic performance.<sup>17</sup>

Based on the Reasoned Action Approach (RAA), the best predictor of whether or not adolescents practice meditation likely is their intention to do so.<sup>18</sup> Therefore, if school health professionals are interested in increasing students' engagement in meditation, interventions should focus on increasing their intentions to begin meditating. The RAA

model posits that behavioral intentions (e.g., if adolescents think they will start meditating) are influenced by attitudes, perceived norms, and perceived behavioral control.<sup>19</sup> *Attitudes* refer to evaluations about the behavior being good/bad and/or enjoyable/unenjoyable.<sup>19</sup> Perceptions of positive consequences from the behavior should increase, and perceptions of negative consequences should decrease. *Perceived norm* includes seeing other important people as approving of the behavior and other similar individuals engaging in the behavior.<sup>19</sup> Perceiving others as supportive of the behavior should increase behavioral intentions. Finally, *perceived behavioral control* refers to viewing the behavior as under the person's control and/or the person's self-efficacy with respect to the behavior.<sup>19</sup> Intentions to engage in a behavior should be greater when one believes they will do so. The goal of this study was to examine the association between high school students' meditation attitudes, perceived norm, and perceived behavioral control and their intention to meditate as defined by the RAA.

## **METHODS**

### **Participants**

The sample included 9<sup>th</sup>-12<sup>th</sup> grade students from one public high school in upstate New York (N=135) enrolled in a required health education course. All assumptions were met and four participants were removed due to straight-lining responses along with 16 others due to a large amount of missing data leaving, the final analytical sample at N=115.

### **Instrumentation**

The study survey was developed by following the procedures outlined by Fishbein and Ajzen.<sup>19</sup> It was pilot tested with 15 high school students (mean age = 16).

Slight modifications were indicated based on pilot-test feedback. The instrument was revised and programmed into Qualtrics (Provo, Utah, 2002) for use with the study sample.

## **Measures**

*Intention to meditate.* Intention to try meditating twice in the next week was measured with a 4-item scale ( $\alpha = .890$ ). Each item was rated on a 5-point scale. Scores were computed by averaging across the items; higher scores reflect greater intention to try meditating. Proportional averages were used to account for missing data. Participants must have completed at least three of the four items for intention, in which case the average of the three completed items was used to impute a score for the missing item. Participants who missed two or more items were not counted in the final analytical sample.

*Attitudes.* Adolescents completed a 5-item semantic differential scale to assess their attitudes towards trying to meditate at least twice in the next week ( $\alpha = .926$ ). The five sets of adjectives were: fun-boring, enjoyable-unenjoyable, wise-foolish, good-bad, and helpful-unhelpful. Scores for attitudes towards meditation were computed by averaging across the items; higher scores reflect perceiving more positive outcomes from meditating. Proportional averages were used to account for missing data. Participants must have completed at least four of the five items for attitudes, in which case the average of the four completed items was used to impute a score for the missing item. Participants who missed two or more items were not counted in the final analytical sample.

*Perceived norm.* Adolescents completed 4-items, each rated on a 5-point scale, to assess their perceived norm regarding trying to meditate at least twice in the next week ( $\alpha = .752$ ). The four sets of questions asked about whether or not people important to them would approve of them meditating and if others like them meditate. Scores for perceived norm regarding meditation were computed by averaging across the items; higher scores reflect perceiving meditating as normative. Proportional averages were used to account for missing data. Participants must have completed at least three of the four items for perceived norm, in which case the average of the three completed items was used to impute a score for the missing item. Participants who missed two or more items were not counted in the final analytical sample.

*Perceived behavioral control.* Adolescents completed 4-items, each rated on a 5-point scale to assess their perceived behavioral control regarding trying to meditate at least twice in the next week ( $\alpha = .813$ ). The four sets of questions asked about whether or not trying to meditate was up to them and personal confidence in their ability to meditate. Scores for perceived behavioral control regarding meditation were computed by averaging across the items; higher scores reflect perceiving better control over meditating. Proportional averages were used to account for missing data. Participants must have completed at least three of the four items for perceived behavioral control, in which case the average of the three completed items was used to impute a score for the missing item. Participants who missed two or more items were not counted in the final analytical sample.

*Demographics.* The final instrument included demographic questions assessing sex (male, female, or other), age (14-18), race/ethnicity (White/Caucasian, Black or

African American, Latino or Hispanic, Asian or Asian American, Multi-racial, other), family structure (who the participant lives with such as ‘mother and father’, ‘just mother’, etc.), and parent education (did your mother and/or father graduate from college).

*Self-regulation.* Self-regulation was measured using the Adolescent Self-Regulation Inventory (ASRI), which includes questions such as “*I can start a new task even if I’m already tired*” and “*I lose control whenever I don’t get my way*”, measured by a 5-point scale ranging from “*Not at all true for me*” to “*Very true for me*”. The ASRI demonstrated sufficient concurrent and construct validity in a previous study<sup>15</sup> and was included in the current study as a control variable by using the average score from all 27 items. Higher scores on the ASRI mean greater self-regulation.

## **Procedures**

Students attending a Northeastern U.S. high school were recruited to participate in a study asking about their perceptions of meditation and other health-related questions. Two teachers at the high school were contacted about allowing their students to participate in the study. They agreed and received formal approval from the district superintendent. A study information sheet was given to students and sent home to parents explaining the study and informing both students and parents about the voluntary nature of the study.

Data collection used the following procedure: First, a brief video was shown to provide a definition for and information about meditation so that students could understand what was meant by meditation in the survey. Following the video, students completed the study instrument via Qualtrics (Provo, Utah, 2002) on laptop computers in

their classroom. Inclusion criteria were adolescents between ages 14-18 and being a student in one of the health classes at the high school.

### **Data Analysis**

To determine if intention to meditate was associated with participants' attitudes towards meditation, perceived norm, and/or perceived behavioral control, bivariate correlations among the variables were first computed. A multiple regression model was then computed that controlled for age, gender, race/ethnicity, family structure, parent education, and self-regulation. The assumptions of regression were evaluated, including adequate sample size, normality, linearity, homoscedasticity of residuals, absence of outliers, and absence of singularity and multicollinearity to determine if any cases were outliers and if all assumptions were met.



## RESULTS

<b>TABLE 1. Participant Characteristics</b>		
Characteristic	n	%
Sex		
Female	55	47.8
Male	56	48.7
Other	4	3.5
Race/Ethnicity		
White/Caucasian	53	46.1
Black or African American	18	15.7
Latino or Hispanic	21	10.4
Asian or Asian American	7	6.1
Multiracial	10	8.7
Other	15	13
Age		
14	2	1.7
15	0	0
16	49	42.6
17	48	41.7
18	16	13.9
Family Structure		
Biological Parents	50	43.5
Mother	33	28.7
Father	5	4.3
Mother and Step Father	15	13.0
Father and Step Mother	4	3.5
Grandparents	5	4.3
Foster Parents	3	2.6
Family Education		
Mother Graduated College	47	40.9
Father Graduated College	34	29.6

Participants (N=115) were evenly divided by sex and less than half were Caucasian; over 80% were age 16 and 17. Less than half of participants lived with both biological parents or a parent who had completed college (Table 1).

**TABLE 2. Means, Standard Deviations, and Correlations (N=115)**

Scale	M	SD	INT	ATT	PN	PBC	SR
INT	2.47	1.02	-	.814***	.713***	.699***	.075
ATT	2.97	1.10		-	.642***	.731***	.177
PN	2.26	0.86			-	.656***	.076
PBC	3.01	1.12				-	.302***
SR	3.28	0.50					-

\*\*\*  $p < .001$

### Bivariate Associations

Students' intentions to meditate were positively correlated with their attitude towards meditation, perceived norm, and perceived behavioral control. Additionally, attitude towards meditation, perceived norm, and perceived behavioral control were also correlated with each other (Table 2).

**TABLE 3. Associations of Intention to Meditate at Least Twice During the Next Week (N=115)**

Predictor Variable	t	B	SE B	$\beta$	p
ATT	7.03***	0.515	0.073	.554	.000
PN	3.78***	0.320	0.085	.268	.000
PBC	1.62	0.125	0.077	.137	.107
Self-Regulation	-1.53	-0.180	0.117	-.088	.128
Male	-0.84	-0.094	0.112	-.046	.401
Age	0.77	0.052	0.068	.040	.441
White/Caucasian	0.11	0.012	0.107	.006	.909
Biological Parents	0.10	0.011	0.113	.005	.921
Mother Education	0.07	0.149	0.114	.072	.192

Note.  $R^2 = .743$ ,  $F = 33.662$ ,  $df = 9, 114$

\*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$

### Multiple Regression Analysis

The regression model was significant,  $F(9, 114) = 33.662$ ,  $p = .000$ , and accounted for 74.3% of the variance in students' intentions to meditate (Table 3). Among the RAA constructs, attitude towards meditation ( $\beta = .554$ ,  $p < .001$ ) and perceived norm

( $\beta = .268, p < .001$ ) were significantly associated with intentions to meditate, but perceived social control was not ( $\beta = .14, p = .107$ ). Therefore, attitude towards meditation and perceived norm appear to make the only statistically significant impact on intention to meditate while controlling for other factors.

## **DISCUSSION**

Despite the numerous benefits that can come from meditating<sup>1-4</sup>, few adolescents appear to practice meditation<sup>5</sup>. Based on the RAA,<sup>19</sup> in order to increase prevalence of adolescent meditation, it is critical to first increase their intentions to engage in this health promoting behavior. Results from the current study provide important insights into how participants' attitude towards meditation, perceived norm, and perceived behavioral control may shape adolescents' intentions to meditate. Specifically, results suggest that an adolescent's intention to try meditating is associated with their attitude towards the behavior and their perceived norms regarding meditation. This means that an adolescent's intention to meditate is primarily based on them viewing meditation as being good, helpful, and enjoyable. Secondly, an adolescents' intention to meditate is based on them perceiving that important people in their life would approve of them meditating and that others like them meditate.

The large impact of attitude on intention is somewhat consistent with two meta-analyses of RAA studies,<sup>20,21</sup> along with a study examining beliefs about meditation within a college setting<sup>22</sup>, all of which found that attitude had a high mean regression weight. Interestingly, in the current study perceived norm had the second highest regression weight, a finding that is inconsistent with the overall results from a meta-analysis of RAA studies.<sup>20</sup> This discrepancy in findings may be due to the age

differences in the current study population (mean=16.7) and the meta-analysis<sup>20</sup> which included both adolescents and adults. Two meta-analyses by McEachen and associates<sup>20,21</sup> found perceived norm had a much stronger relationship with intention in the studies that included adolescents/school aged populations than among those with adult samples. This difference may be related to adolescents being driven more so by social factors<sup>23,24</sup> than are adults, due to immature executive functions.<sup>25</sup>

Although the RAA identifies perceived behavioral control as an important construct in influencing intention, the current study found no statistically significant association between the two. However, the high and statistically significant bivariate correlation between attitude and perceived behavioral control indicated that there may be some multicollinearity between these variables. Further testing revealed Variance Inflation Factors below 2.5 (well below 4, which has been used as a cutoff point<sup>26</sup>) suggesting a low likelihood of multicollinearity. The previous study investigating college constituents' perceptions of meditation found that perceived behavioral control had the highest regression weight<sup>22</sup> as did a study examining yoga class attendance.<sup>27</sup> The discrepancy found in the current study could potentially be due to the experience individuals had with the behavior in the two aforementioned studies; a majority of participants had previously used the behavior versus the present study where most of the participants had never tried meditation (53%) and 86% indicated that they meditate a few times per year or less. It may be that perceived behavioral control is not as important for behavior adoption as it is for behavior continuation. Further, it may also mean that adolescents, prior to trying meditation, may perceive the behavior as not being very difficult.

The present study had limitations, including a small sample size (N=115) drawn from one school, making generalizations for a larger population difficult. Although the RAA measurement items were pilot tested, used in a previous study<sup>22</sup>, and established via procedures for developing RAA measures<sup>19</sup>, they have yet to undergo additional validity tests. The current study also had a large amount of missing data (15%) which may introduce biases. Finally, the finding that perceived behavioral control was not statistically significantly associated with intention may be due to the brief one-minute meditation experience used in the video prior to taking the survey, which may have led adolescents to perceive meditation as not that difficult. Study strengths included the diverse sample, the instrument being designed following procedures creating RAA items<sup>19</sup>, with pilot testing, and each RAA construct's reliability level.

## **Conclusions**

Meditation is an important health-enhancing behavior that few young people practice.<sup>5</sup> When program planners design interventions intended to help individuals adopt health behaviors, it is essential that they use theoretical constructs in addressing determinants of those behaviors because interventions, thus designed, are more effective<sup>28</sup>. Two important RAA determinants of meditation to address with adolescent populations who have not acquired the behavior are their attitudes towards meditation and their perceptions about the extent to which meditation is normative. These two findings will be useful to those designing health education curriculum.

Future research should survey a larger, more representative sample of adolescents using the results of this and a second study that included open-ended questions to elicit specific beliefs adolescents hold with regard to trying to meditate.<sup>29</sup> Specifically, the

survey should ascertain from the larger sample the strength of specific beliefs adolescents have regarding their attitude towards and perceived norm of trying to meditate. Data from the proposed research would enable intervention and curriculum designers to identify the beliefs more strongly associated with intention and to more effectively prioritize curriculum components.

## **IMPLICATIONS FOR SCHOOL HEALTH**

School-based health programs should first prioritize helping adolescents have a positive attitude towards meditation when helping them adopt the behavior. They can do so by helping adolescents view it as useful for self-regulation with respect to stress (which is prevalent at high levels for teenagers<sup>30</sup>), focus, and relaxation, which are all positive outcomes of meditation that adolescents identified in other research.<sup>29</sup> School-based health programs, after first focusing on shifting adolescents' attitudes about meditation, should then focus on changing adolescents' perceived norm regarding meditation.

The health education and physical education programming in schools can help influence adolescents to have a positive attitude towards meditation by sharing the numerous benefits of meditation instruction during units of study on stress management or yoga. The physical school environment can help young people see meditation as normative by implementing a social marketing campaign that engages young people with high social standing within the school to try meditating, along with using the school's social media outlets to promote the behavior.<sup>31</sup> Offering classes or workshops for parents and staff can help improve family engagement and employee wellness which, in turn, also helps young people see meditation as normative. Finally, involving local certified

meditation instructors in educating students in the classroom or via wellness fairs can enhance community involvement.

### **Human Subjects Approval Statement**

This study was approved by the Institutional Review Board at Indiana University.

### **ACKNOWLEDGEMENTS**

The authors disclose receipt of the following financial support for the research of this article: Funding for incentivizing school participation was provided by grants from the Indiana University Graduate School and the School of Public Health-Bloomington.

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## **CHAPTER 5: MANUSCRIPT 2**

### **A Salient Belief Elicitation Examining Adolescents' Beliefs About Meditation Using the Reasoned Action Approach**

#### **ABSTRACT**

**Background:** Meditation is a health behavior that has been shown to promote health by improving self-regulation during adolescence, an essential capacity for young people to develop in order to live a healthy and successful life. At the present time, very few young people in the United States meditate.

**Aims:** Identify adolescents' consequence, referent, and circumstance beliefs about trying to meditate at least twice in the next week in order to inform effective intervention design.

**Methods:** Adolescents (N = 129), recruited from Northeastern high school, responded to open-ended questions designed to elicit beliefs underlying intention to try meditating at least twice in the next week. Thematic analysis was used to identify beliefs and frequencies of the beliefs were computed.

**Results:** Five types of salient meditation beliefs were identified: advantages (e.g., reduces stress, increases relaxation, improves focus), disadvantages (e.g., slows down), supporters and disapprovers (e.g., family and friends), and facilitating circumstances (e.g., more time, fewer distractions).

**Discussion:** Adolescents see trying to meditate as having health benefits but also taking time. They also view it as being a socially acceptable behavior but need the time and conducive environment to try the behavior.

**Conclusion:** Health professionals working with adolescents may be able to promote meditation by designing interventions that help them see meditation as being beneficial, approved of by important others as well as not slowing them down, and provide options for making the time needed to meditate.

## **Introduction**

Adolescent health and development researchers have increasingly come to recognize the importance of adolescent self-regulation (i.e., abilities to control thoughts, feelings, and behaviors) in health promotion (cites). Self-regulation appears to promote adolescent stress management (Moilanen, 2007) and academic success (Duckworth & Seligman, 2005; Wulfert, Block, SantaAna, Rodriguez, & Colsman, 2002; Zimmerman, 2000a, 2000b) as well as reduce mental health challenges (Posner, Rothbart, & Sheese, 2007) and health-risk behavior (Raffaelli & Crockett, 2003; Wills & Dishion, 2004; Wills, Sandy, & Yaeger, 2002). In addition to benefiting well-being during adolescence, youth self-regulation skills are longitudinally associated with better health, higher income, and fewer legal troubles (Moffitt et al., 2011). Thus, the exigent literature supports the need for health promotion programs targeting adolescent self-regulation.

Recent research with adolescents has demonstrated that meditation can improve attention (Baijal, Jha, Kiyonaga, Singh, & Srinivasan, 2011; Bogels, Hoogstad, van Dun, de Schutter, & Restifo, 2008; Weijer-Bergsma, Formsma, Bruin, & Bogels, 2011) and emotion regulation (Barnert, Himmelstein, Herbert, Garcia-Romeu, & Chamberlain, 2014; Broderick & Metz, 2009; Metz et al., 2013; Schonert-Reichl & Lawlor, 2010). These findings may be the result of ways meditation can affect regions of the brain associated

with self-regulation such as greater activation in the Pre-Frontal Cortex while regulating positive emotions (Urry, Roeser, Lazar, & Poey, 2012) and increased white matter in the Anterior Cingulate Cortex, a sign of greater brain connectivity (Tang et al., 2010; Xue, Tang, & Posner, 2011).

Although meditation holds promise as an effective way to promote adolescent self-regulation, few youth meditate. Nationwide, only 1.6% of young people ages 4-17 practiced any form of meditation over the past 12 months (Black, Clark, Barnes, Stussman, & Nahin, 2015). Program designers and planners who intend to help youth adopt the health-behavior of meditation need information regarding beliefs about the practice because interventions that are designed with these proximal influences in mind are more likely to be effective (Glasgow & Linnan, 2008).

Based on the Reasoned Action Approach (RAA) (Fishbein & Ajzen, 2010), in order to increase a health behavior (e.g., meditation), it is important to explore individuals perceptions about that behavior. By understanding their beliefs, meditation intervention designers can help high school students adopt more positive beliefs that would facilitate the adoption of the behavior. Further, they can help high school students minimize the negative beliefs about the behavior that may prevent them from adopting the behavior.

Previous work with adults has examined beliefs about meditation. One study whose aim was to develop an instrument to identify barriers to meditation use found that barriers included misconceptions, pragmatic concerns and sociocultural beliefs (Williams, Dixon, McCorkle, & Van Ness, 2011). A follow-up study identified misconceptions as the most common barrier (Williams, Van Ness, Dixon, & McCorkle,

2012). A second study involving the Theory of Planned Behavior to examine psychological and social determinants of individuals attending yoga classes found that individuals attend irregularly if they cannot overcome the barriers of lacking time and money for classes (Eggleston, Middlestadt, Lindeman, McCormich, & Koceja, 2011). Finally, a salient belief elicitation using RAA to examine university constituents' beliefs about meditation found advantages such as reduced stress and feeling calmer, disadvantages such as takes time and will not work, and enabling factors such as having more time and having a quiet space (Lederer & Middlestadt, 2014). To date, no research has explored how adolescents view meditation (Erbe & Lohrmann, 2016).

The current study framework was based on the RAA, a theory that has been successfully used to predict and influence a variety of behaviors (Fishbein & Ajzen, 2010). The RAA suggests that the best predictor of behavior is a person's intention to engage in the behavior. Further, intentions are influenced by attitudes toward the act, perceived norm, and perceived behavioral control or self-efficacy regarding the behavior. Qualitative studies are implemented to understand beliefs that underlie each of the three constructs including beliefs about the consequences of performing the behavior, beliefs about social referents, such as those who would approve or disapprove of the behavior, and beliefs about facilitators and barriers of performing the behavior (Fishbein & Ajzen, 2010). An essential step in using the RAA to develop interventions is an elicitation to identify salient beliefs or what comes to the mind first with regard to consequences, referents, and circumstances. According to the RAA, not all behavioral beliefs influence intention; only the top-of-the-mind beliefs serve as determinants (Fishbein & Ajzen, 2010).



## **Present Study**

In the current study, a sample of high school students answered open-ended questions about their beliefs regarding meditating at least twice in the next week to identify the most frequently mentioned beliefs. Therefore, it addresses a significant gap in the literature (i.e., what do adolescents believe about trying to meditate at least twice during the next week). Questions were constructed after first specifying the behavior with respect to action, target, context, and time (Fishbein & Ajzen, 2010). The action and target chosen were “adolescents trying to meditate” because meditation has been shown to increase self-regulation among this population (yet so few young people practice meditation). The chosen context was “anywhere” to allow participants to feel comfortable using meditation anywhere and the time was “twice during the next week” because it was assumed that most participants would begin to engage in the behavior. The research question was: What are the salient, top-of-the-mind beliefs held by adolescents ages 14-18, about trying to meditate at least twice during the next week?

## **Methods**

### **Procedures**

The study was approved by the Indiana University IRB. After receiving approval from the district superintendent, two health teachers in an Upstate New York high school agreed to allow their students to voluntarily participate in the study. A study information sheet was provided for students and sent home to obtain passive parental consent. A monetary reward was offered to the school for facilitating completion.

Meditation is subjective in nature, can be defined in many ways, and many forms exist. Therefore, to ensure participants understood the study definition of meditation a

brief 8.5-minute video was shown that displayed various ideas people have about meditation, a definition given by the National Center for Complementary and Integrative Health (NCCIH), a guided 1-minute meditation experience, myths about meditation, and examples of smart phone applications that people use to meditate. Following the video and prior to taking the survey the following NCCIH description was provided:

For the purposes of this study, meditation is defined as consisting of the following: Going to a quiet location with as few distractions as possible; sitting in a comfortable posture; focusing attention on a given point (sensations of the breath or a word/phrase) for a few minutes; having an open attitude (letting distractions come and go naturally without judging them) (NCCIH, 2007).

Following the video, participants then completed the Qualtrics-administered (Provo, Utah, 2002) elicitation survey.

### **Participants**

The study sample included students from one large public high school in upstate New York (N=135) currently enrolled in a health education course. Inclusion criteria included being between ages 14-18 and a student in a high school health class.

### **Instrumentation**

The elicitation items were pilot tested with 15 high school students (mean age=16) to determine if students understood the questions and study procedure. Six open-ended questions were used to elicit salient beliefs regarding “trying to meditate at least twice in the next week.” Two questions focused on meditation consequences: “What are one or two good things that might happen if you meditate at least twice in the next week?” and “What are one or two bad things that might happen...?” Two questions were about who might approve or disapprove of their attempts to meditate: “What one or two people might support you if you meditate at least twice in the next week?” and “Who,

which people or groups, might disapprove of you.....?” Two questions were about what might make it easier or harder to meditate: “What one or two things might make it easier for you to meditate at least twice in the next week?” and “What one or two things might make it hard for you....?” Students were provided the following instructions for how to respond to the elicitation items: “Please tell us the things that come to your mind for each of the following questions. List 1-3 top-of-the-mind responses. There are no right or wrong answers; just write what comes to your mind first.”

Participants were also asked to provide demographic information (e.g., sex, age, race/ethnicity, family structure, and parental education).

### **Data Analysis Plan**

Content and thematic analyses of the responses to the open-ended questions were conducted to create categories (themes) that included groups of similar responses. The text from Qualtrics was downloaded verbatim to a separate excel file for each question (six in total). Responses were reviewed verbatim and grouped independently by consequences (advantages and disadvantages of meditation), referents (people who approve and disapprove of meditation), and circumstances (what makes it easy and hard to meditate). As each of the independent question responses were reviewed, similar responses (content) were moved and placed together in the excel file. Progressively, the most frequently mentioned words or phrases in each group were moved to the top of the group and used as the label for that group. Once a group was established it became a category (theme) and group/category labels became the names for each code. Coding procedures were created to identify ten to fifteen codes of common responses for each open-ended question. A team of researchers with experience in using the RAA examined

each category and suggested combining several. These categories were combined and reviewed.

After each category was reviewed and agreed upon by the team, independent data coding was conducted. To establish reliability, a subset of responses (34 each for advantages, disadvantages, approve, disapprove, easier, and harder or 25% of the data) was randomly selected and coded by two team members. Interrater agreement among team members, using the kappa statistic, was employed to assess coding reliability. The kappa statistic for each construct yielded a high level of reliability: .956 for positive consequences, .833 for negative consequences, .926 for supporters, 1.000 for disapprovers, .943 for easy circumstances, and 1.000 for hard circumstances (Landis & Koch, 1977).

After the categories were created along with establishing sufficient reliability, a series of mentioned/not mentioned variables corresponding with each code was created and added to the raw data in the original excel file. These variables were coded 1 for a student if he or she had mentioned an item in the specific code or left blank if the student did not mention anything in that particular code. This coding process set-up the frequency analysis.

The resultant dataset included the responses to the close-ended demographic questions for each participant and the series of variables (1 or blank) that represented codes for advantages, disadvantages, approving referents, disapproving referents, facilitating circumstances, and hindering circumstances. The frequency analysis involved calculating totals for each code and determining which were mentioned most often.

## Results

In cleaning the data, two participants were removed due to unrealistic responses and four participants were removed due to missing data. The final study sample included 129 high school students closely divided between males and females (n=63 and n=60 respectively). Participants were primarily 16 and 17 year olds, representing 85% of the sample. The participants were diverse in terms of race/ethnicity with more than half (53.9%) of minority descent. Finally, more than half lived in a home without both biological parents (57.4%), and more than half had a mother or father who did not graduate from college (Table 1).

<b>TABLE 1. Participant Characteristics</b>		
Characteristic	n	%
Sex		
Female	60	46.5
Male	63	48.8
Other	6	4.7
Race/Ethnicity		
White/Caucasian	58	46.1
Black or African American	24	18.6
Latino or Hispanic	12	9.3
Asian or Asian American	7	5.4
Multiracial	11	8.5
Other	17	13.2
Age		
14	2	1.6
15	0	0
16	54	41.9
17	56	43.4
18	17	13.2
Family Structure		
Biological Parents	55	42.6
Mother	38	29.5
Father	5	3.9
Mother and Step Father	16	12.4
Father and Step Mother	5	3.9
Grandparents	4	3.1
Foster Parents	3	2.3
Family Education		
Mother Graduated College	53	41.1
Father Graduated College	39	30.2

The following tables include the number of students who mentioned each category and is aligned with the percent of students represented. Participants were able to list more than one response, therefore percentages in each table may add up to more than 100%. Because tables identify only the most common themes, each column under n showing the number of students who identified each theme/category does not sum to the final analytical sample (N=129).

#### *Salient Consequences Underlying Attitude toward the Act Component*

The most common perceived advantage of trying to meditate twice in the next week was *will reduce my stress* (39%, n = 50), which included responses such as “less stressed” and “stress relief.” The second most common advantage was *will make me relax* (33%, n = 43), with responses such as “I’ll be peaceful”, “being calm”, and “feel relaxed.” The third involved *being more focused* (22%, n = 29). Participants provided responses such as “better focus”, “better concentration”, “increase my attention”, and “clear my thoughts.”

Two main disadvantages emerged. The first was *it will take time* (38%, n = 49) with participants specifically responding by indicating trying to meditate at least twice in the next week would result in “waste of time,” “loss of time,” “time consuming,” and “don’t have time.” The second most common disadvantage was that trying to meditate would *slow me down* (12%, n = 15). Participants responded with “I might fall asleep,” “might get bored,” or “become too laid back.” Several students indicated that there are *no disadvantages* (14%, n = 18) while only three (2%) indicated that there are no advantages.

**TABLE 2. Salient Consequences Trying to Meditate at Least Twice in the Next Week**

Consequence	n	%
<b>Advantages</b>		
Trying to meditate at least twice in the next week...(N=129)		
Will reduce my stress	50	39%
Will make me relax	43	33%
Will help me relax	18	14%
Will make me more calm	15	12%
Will give me peace	11	9%
Will make me more focused	29	22%
Will help me focus	19	15%
Will clear my mind	4	3%
Will help me concentrate	3	2%
Will increase my attention	3	2%
<b>Disadvantages</b>		
Trying to meditate at least twice in the next week...(N=129)		
Will take time	49	38%
Will be a waste of time	13	10%
Will lose time	11	9%
Will take time	14	11%
Will not have time	9	7%
Will slow me down	15	12%
Will fall asleep	8	6%
Will get bored	2	2%
Will become too laid back	5	4%
Nothing	18	
		14%
Note: Percentages sum to more than 100%, since participants could list multiple answers		

### *Salient Referents Underlying Normative Component*

*Family* (66%, n = 85) and *Friends* (19%, n = 24) were identified by students as those who would approve of them trying to meditate at least twice in the next week (Table 3). Most participants who identified *Family* specifically referred to either “parents” or their “mom.” Those identifying *Friends* either stated “friends” or “boyfriend” as being supportive. The third most common referent students believed

would approve of them trying to meditate was *School Personnel* (16%, n=21) which included either “my teacher” or “my coach.”

Specific people or groups of people that were mentioned as disapproving of participants trying to meditate were *Friends* (22%, n = 29) and *Family* (19%, n = 25). A small percentage of students (5%, n = 6) identified *School Personnel*, specifically “teachers” as disapprovers. A larger percentage of participants indicated that *No One* (34%, n = 44) would disapprove of them trying to meditate while a smaller percentage indicated that *No One* (8%, n = 10) would be supportive. A larger percentage of students believed that their parents would approve of them trying to meditate rather than disapprove (66% vs. 19%) while a similar percentage believed their friends would approve of them trying to meditate rather than disapprove (19% vs. 22%).

**TABLE 3. Salient Referents for Meditating at Least Once Per Week for the Next Month**

Salient Referents	n	%	Salient Referents	n	%
<b>Approving referents</b>			<b>Disapproving referents</b>		
...approves of me trying to meditate at least twice in the next week (N=129)			...disapproves of me trying to meditate at least twice in the next week (N=129)		
Family	85	66%	Family	25	19%
Both Parents	32	25%	Both Parents	3	2%
Mom	31	24%	Mom	5	4%
Dad	4	3%	Dad	3	2%
Sister	9	7%	Sister	4	3%
Grandparents	4	3%	Grandparents	1	1%
Other family	5	4%	Other family	9	7%
Friends	24	19%	Friends	29	22%
Friends	18	14%	Friends	29	22%
Boyfriend	6	5%	Boyfriend	0	-
School Personnel	21	16%	School Personnel	6	5%
Teacher	19	15%	Teacher	6	5%
Coach	2	2%	Coach	0	-
No One	10	8%	No One	44	34%

Note: Percentages sum to more than 100%, since participants could list multiple answers



### *Salient Circumstances Underlying Control Component*

Students were able to identify top-of-the-mind facilitators and barriers that underlie the control component of trying to meditate at least twice during the next week (Table 4). Time was the most frequently elicited circumstance. Half of students mentioned that having more time would make trying to meditate at least twice in the next week easier. Similarly, 54% indicated not having time would make trying to meditate harder. Distractions were the second most frequently elicited circumstance with 34% of the students mentioning that limiting distractions would make trying to meditate easier, while 35% indicated that having distractions would make it harder.

**TABLE 4. Salient Circumstances for Trying to Meditate at Least Twice in the Next Week**

Salient Circumstances	n	%	Salient Circumstances	n	%
<b>Facilitators</b>			<b>Barriers</b>		
...makes it easier to try meditating at least twice in the next week (N=129)			...makes it more difficult to try meditating at least twice in the next week (N=129)		
Having/Taking Time	65	50%	Not Having Time	70	54%
Having Time/Free Time	35	27%	Not Having Time/Being Busy	39	30%
Having Less School	19	15%	Having School/Homework	25	19%
Scheduling Time	11	9%			
			Having Sports Activities	7	5%
			Having a Job	9	7%
Limiting Distractions	44	34%	Having Distractions	45	35%
Having a Quiet Place	22	17%	Being Noisy	19	15%
Being Alone	11	9%	Having People Around	9	7%
Having a Place	6	5%	Having Other Distractions	12	9%
Being Able to Relax	5	4%	Having and Emotional Issue	5	4%
Note: Percentages sum to more than 100%, since participants could list multiple answers					

## **Discussion**

This was the first study to investigate adolescents' salient top-of-the-mind beliefs about trying to meditate twice in the next week. Based on the constructs included in the RAA, beliefs related to attitudes, norms, and control related to trying to meditate were elicited. Results from this study will be valuable to researchers and program designers because they fill an important knowledge gap. Because this study was guided by a theory-based approach, interventions developed on the basis of these results are more likely to be effective (Glasgow & Linnan, 2008). Specific recommendations for designing interventions based on the current findings are described in 'Implications for Practice'.

The salient belief elicitation revealed a number of the top-of-the-mind consequences, circumstances, and referents that may influence adolescents' decision to meditate. Students in this study perceive meditation to have advantages that underlie their attitudes toward the behavior such as reducing their stress, promoting relaxation, and helping them be more focused. This finding was similar to a previous salient belief elicitation study on meditation with college students and university staff members, which found reduced stress as the most commonly perceived benefit (Lederer & Middlestadt, 2014). Interestingly, students viewed meditation as having the disadvantage of slowing them down. This response was not found in prior studies of barriers to meditation with adults (Williams et al., 2011; Williams et al., 2012) and may be a unique perception held by adolescents. Young people reach their peak in sensation seeking during adolescence (Duell et al., 2016; Steinberg et al., 2017) and therefore may view slower, less active behaviors such as meditation to be less attractive.

The perceived advantages provided by participants in this study were similar to those found in much of the research on the benefits of meditation in adolescent populations. Two meta-analyses of Mindfulness Meditation (MM), a specific type of meditation that emphasizes awareness of the present moment, found that MM can help improve focus (Zoogman, Goldberg, Hoyt, & Miller, 2014) and reduce stress (Zenner, Hermleben-Kurz, & Walach, 2014). A review of school-based meditation interventions identified several studies showing meditation to be a useful strategy for relaxation and emotional coping (Wisner, Jones, & Gwin, 2010).

Many participants considered their family, primarily parents, to be the most supportive referent underlying their perceived norm of trying to meditate, a finding that was consistent with other salient belief elicitations for adolescents when investigating various health behaviors (Coe, Mooradian, Wallace, & Middlestadt, 2011; Middlestadt, 2012; Zhang, Middlestadt, & Ji, 2007). Very few students felt that their parents would disapprove, suggesting that for the most part adolescents see their parents as people who would approve of them trying to meditate. Friends, teachers and coaches were also seen as referents who would support their trying to meditate. The largest percentage of participants suggested that no one would disapprove of their meditating which shows that, for the most part, meditation is viewed by adolescents as an acceptable behavior. Interestingly, no participants listed religious leaders as someone who would either approve or disapprove. Helping young people see meditation as a socially normative and acceptable behavior is especially important for practitioners working with high school populations as adolescents tend to be particularly influenced by their social environment (Gibbons, Houlihan, & Gerrard, 2009; Lau, Quadrel, & Hartman, 1990).

Participants indicated that the most salient circumstance underlying their control over trying to meditate was time. This finding is consistent with two studies involving older samples (Lederer & Middlestadt, 2014; Williams et al., 2012). Despite this finding, several participants described the strategy of scheduling time for meditation for overcoming this barrier. Participant-offered ideas for overcoming barriers have been identified in other elicitations and provide researchers with insight into a population's perceptions regarding feasibility (Middlestadt, 2012). A large number of students indicated that a barrier to meditating was not having time or having other activities such as school or sports. Correspondingly, several students mentioned having more free time or having less school would enable them to try meditation. This finding may indicate that adolescents feel as though their schedules run their lives, but helping them to see that by exerting a small amount of self-regulation through scheduling their time and taking control of their daily activities may help them prioritize important behaviors such as meditation that can further enhance their self-regulation capacities.

### **Limitations, Strengths, and Future Directions for Research**

The current study has several limitations and strengths. Data were collected from one high school in Upstate New York and, therefore, are not be generalizable to all adolescents in the United States. Nevertheless, a small sample size is appropriate for an elicitation study (Fishbein & Ajzen, 2010). A study strength is that the sample was diverse with regard to race/ethnicity, socio-economic status and family structure. Although study questions were developed according to established RAA procedures (Fishbein & Ajzen, 2010), were used in a prior meditation study (Lederer & Middlestadt, 2014), and were pilot tested, no additional validity testing was executed.

Future research should survey a larger, more representative sample of students using the results of this study and a second study that found attitude and perceived norm to have the largest impact on adolescents' intention to try meditating (Erbe, Beckmeyer, Lohrmann, & Middlestadt, 2017). Specifically, the survey should ask respondents about the strength of specific beliefs adolescents have, as found in this study, regarding their attitude towards and perceived norm of trying to meditate. Data from the proposed research would enable intervention and curriculum designers to identify the beliefs more strongly associated with intention and to more effectively prioritize curriculum components.

### **Implications for Practice**

Quantitative studies with a larger and more representative sample and with closed-ended items based on the qualitative findings are needed to better understand adolescents' decisions about trying to meditate. However, findings from this study suggest that high school students' perceptions of meditation as being able to reduce stress, improve focus, relax them, being socially acceptable, and needing to be scheduled may be important factors underlying their decision to try meditating. Specifically, school health education classes and after-school health programs for youth could emphasize the perceived advantages of meditation such as stress reduction, increased relaxation, and improved focus through in-class activities or other educational efforts. A specific lesson plan for incorporating Mindfulness Meditation into a health education classroom has been published elsewhere (Erbe & Lohrmann, 2016).

Because the most commonly identified disadvantage and barrier was time, those that work with youth should help them develop time management and prioritization

skills, along with helping them to see that meditation does not need to be long in duration to have positive effects. Young people should be empowered to see their schedules as something they can control through learning how to prioritize health-enhancing activities such as meditation. At an interpersonal level, teaching meditation in a school-based setting with groups of students or creating after school meditation programs for young people and their family may help adolescents see meditation as a socially normative and acceptable behavior. Finally, program designers can use more active and engaging forms of meditation such as yoga or tai-chi along with helping young people to see that meditation can improve their focus and attention to combat the perceived disadvantage of it slowing them down. This may be the reason why most young people who practice meditation use it in conjunction with yoga (Black et al., 2015). Additionally, some research has indicated that high school students see yoga as being helpful in other active areas of their lives such as sports and school (Conboy, Noggle, Frey, Kudesia, & Khalsa, 2013).

### **Human Subjects Approval Statement**

This study was approved by the Institutional Review Board at Indiana University.

### **Acknowledgements**

The authors disclose receipt of the following financial support for the research of this article: Funding for incentivizing school participation was provided by grants from the Graduate School and the School of Public Health at Indiana University.

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## APPENDIX A: EVIDENCE TABLES

**Evidence Table A: Scope and Significance of Health Issue**

<b>Why is self-regulation important to address?</b>		
<b>Author &amp; Date</b>	<b>Research Method</b>	<b>Findings Relevant to Scope and Sequence</b>
(APA, 2014)	<ul style="list-style-type: none"> <li>Commissioned by the American Psychological Association conducted online by Harris Interactive between August 3<sup>rd</sup>-31<sup>st</sup> 2013</li> <li>Selected from among those who have agreed to participate in Harris Surveys</li> <li>Measures stress levels by a 10-point scale and a 10-item Perceived Stress Scale (PSS)</li> <li>N=1019 teenagers ages 13-17 and N=1950 adults</li> </ul> <p>Results were weighted for age, sex, race/ethnicity, education, region and household income as needed.</p>	<ul style="list-style-type: none"> <li>Results show adults perceive healthy level of stress to be 3.7 but typically experiencing stress levels at 5.1</li> <li>Of adults, 37% say stress has left them feeling overwhelmed in the past month</li> <li>Stress levels for teenagers far exceed what is perceived as healthy during school year (5.8 v 3.9)</li> <li>Teens are more likely to perceive that stress has slight or no impact on their physical health than adults (54% v 39%)</li> <li>Teens are more likely to perceive that stress has slight or no impact on their mental health than adults (52% v 43%)</li> <li>Stress levels past month (summer) are high (4.6 v 3.9)</li> <li>27% of teenagers experience high level stress during the school year</li> <li>31% of teenagers believe their stress has increased in the past year and 34% believe it will increase next year</li> <li>Most common stressor is school (83%) and 59% of teenagers report balancing all activities is somewhat or very significant cause of stress</li> </ul>
(Merikangas et al., 2010)	<ul style="list-style-type: none"> <li>The National Comorbidity Survey-Adolescent Supplement (NCS-A) is a nationally representative face-to-face survey</li> <li>Survey includes 10,123 adolescents aged 13-18 years in the U.S.</li> <li>DSM-IV mental disorders were assessed using a modified version of the fully structured World Health Organization Composite International Diagnostic Interview.</li> </ul>	<ul style="list-style-type: none"> <li>The following conditions were the most common: Anxiety disorders (31.9%), behavior disorders (19.1%), mood disorders (14.3%), and substance use disorders (11.4%).</li> <li>Overall prevalence of disorders with severe impairment and/or distress was 22.2% (40% meet criteria for a second)</li> <li>Approximately 1 in every 4-5 youth in the U.S. meets criteria for a mental disorder with severe impairment across the lifetime.</li> <li>Common mental disorders in adults typically first emerge in childhood and adolescence.</li> </ul>



Why is self-regulation important to address?		
(Ogden, Carroll, Kit, & Flegal, 2014)	<ul style="list-style-type: none"> <li>• Objective of this study was to provide the most recent national estimates of childhood obesity, analyze trends in childhood obesity between 2003 and 2012, and provide detailed obesity trend analyses among adults.</li> <li>• Weight and height or recumbent length were measured in 9120 participants in the 2011-2012 nationally representative National Health and Nutrition Examination Survey.</li> <li>• In children and adolescents aged 2-19 years, obesity was defined as a body mass index (BMI)-for-age at or above the 95<sup>th</sup> percentile for the sex-specific CDC BMI-for-age growth charts.</li> </ul>	<ul style="list-style-type: none"> <li>• In 2011-2012, 8.1% of infants and toddlers had high weight for recumbent length, and 16.9% of 2 to 19-year-olds and 34.9% of adults aged 20 years or older were obese.</li> <li>• Overall, there was no significant change from 2003-2004 through 2011-2012 in height weight for recumbent length among each of the three groups.</li> <li>• Over the past 30 years, the obesity rates have more than doubled in children and quadrupled in adolescents.</li> </ul>
(CDC, 2016)	<ul style="list-style-type: none"> <li>• Youth Risk Behavior Surveillance (YRBS) monitors six categories of priority health behaviors among youth and adults.</li> <li>• YRBS includes a national school-based risk behavior survey conducted by the CDC.</li> <li>• The report summarizes results for 118 health behaviors plus obesity, overweight, and asthma from the 2015 survey.</li> <li>• The 2015 survey included 37 states, and 19 large urban school district surveys conducted among students in grades 9-12.</li> </ul>	<ul style="list-style-type: none"> <li>• During the 30 days before the survey among the 61.3% who drove a car or other vehicle, 41.5% had texted or emailed while driving.</li> <li>• During the 30 days prior to the survey 32.8% had consumed alcohol, and 21.7% had used marijuana.</li> <li>• Nationwide, 41.2% of students had ever had sexual intercourse and 30.1% had had sexual intercourse during the 3 months before the survey (i.e., currently sexually active).</li> <li>• During the 30 days before the survey, 10.8% of high school students had smoked cigarettes.</li> <li>• During the 12 months before the survey 8.6% of students had attempted suicide.</li> <li>• Finally, 13.9% of students had obesity and 16% were overweight.</li> </ul>

Why is self-regulation important to address?		
(Moffitt et al., 2011)	<ul style="list-style-type: none"> <li>• Participants are members of the Dunedin Multidisciplinary Health and Development Study</li> <li>• The study tracks the development of 1,037 individuals born in 1972-1973 in Dunedin, New Zealand.</li> <li>• Children's self-control during their first decade of life was measured using nine measures of self-control.</li> <li>• Adult outcomes included health, wealth, and crime which were assessed at age 32 by physical examinations, blood tests, personal interviews, record searches, and informant reports.</li> </ul>	<ul style="list-style-type: none"> <li>• Differences between individuals in self-control are present in early childhood and can predict multiple indicators of health, wealth, and crime across 3 decades of life in both males and females.</li> <li>• Also, the researchers were able to disentangle the effects of children's self-control from effects of variation in the children's intelligence, social class, and home lives of their families, thereby singling out self-control as a clear target for intervention policy.</li> <li>• Those children who became more self-controlled from childhood to young adulthood had better outcomes by the age of 32, even after the researchers controlled for their initial levels of childhood self-control.</li> </ul>

**Evidence Table B: Specific Priority Group**

Which specific at-risk group(s) need to be addressed to improve self-regulation?		
Author & Date	Research Method	Findings Relevant to Deciding Behavior and Priority Group
(Duell et al., 2016)	<ul style="list-style-type: none"> <li>• Sample included 5,227 individuals between the ages of 10 and 30 (M=17.05) from 11 countries</li> <li>• Participating countries were initially selected for an international study of parenting and child development known as the Parenting Across Cultures (PAC) study.</li> <li>• Participants in the present study were recruited to study age differences in decision-making and risk-taking.</li> <li>• Participants completed measures assessing risk-taking (3), reward seeking (2), and self-regulation (3)</li> <li>• Covariates measured in this study included intelligence and socioeconomic status.</li> </ul>	<ul style="list-style-type: none"> <li>• Results of the study revealed that greater reward seeking predicted higher risk-taking and stronger self-regulation predicted lower risk-taking.</li> <li>• Reward seeking and self-regulation have largely independent associations with risk-taking.</li> <li>• The relations between these traits and risk taking are not exclusively adolescent phenomena.</li> <li>• The ways in which reward seeking and self-regulation are linked to risk-taking vary somewhat across cultures.</li> <li>• Both reward seeking and self-regulation predict risk-taking in Western countries such as the United States.</li> <li>• The development of self-regulation is hypothesized to be more susceptible to environmental influence relative to reward seeking.</li> <li>• It appears that risk-taking at all ages is influenced by high reward seeking and poor self-regulation.</li> </ul>

Which specific at-risk group(s) need to be addressed to improve self-regulation?		
(Steinberg et al., 2017)	<ul style="list-style-type: none"> <li>• Sample included 5,404 individuals between the ages of 10 and 30 years from 11 countries.</li> <li>• The sample is from a larger study known as the Parenting Across Cultures (PAC) study.</li> <li>• Participants completed questionnaires to collect demographic information.</li> <li>• Participants also completed measures assessing intelligence, sensation-seeking (3), and self-regulation (3).</li> <li>• A series of regression analyses were completed to investigate age trends within the sample for sensation seeking and self-regulation and all six control variables.</li> </ul>	<ul style="list-style-type: none"> <li>• The age pattern for sensation seeking followed an inverted-U pattern, increasing across adolescence, peaking at around age 19, and subsequently decreasing into adulthood.</li> <li>• The age pattern for self-regulation increased until the early to mid 20's without a marked decrease afterwards.</li> <li>• Regardless of how it is measured, the development of self-regulation clearly is not complete by the end of adolescence.</li> <li>• Overall the conclusion of this study is that adolescence is a time of heightened sensation seeking and immature self-regulation.</li> </ul>

**Evidence Table C: Specific Behavior**

Which behavior(s) need to be addressed to improve self-regulation?			
Author & Date	Research Method	Findings Relevant to Deciding Specific Behavior	Comments
(Bogels, Hoogstad, van Dun, de Schutter, & Restifo, 2008)	<ul style="list-style-type: none"> <li>• Mindfulness Meditation (MM), 14 youth with ADHD/ODD/OC D ages 11-17 (mean age 14.4)</li> <li>• Training was Mindfulness Based Cognitive Therapy (MBCT)</li> <li>• Body scan, mindful breathing, and sitting meditations</li> <li>• 8 weekly sessions of 1.5</li> </ul>	<ul style="list-style-type: none"> <li>• From pre-test to posttest children reported significant improvements on YSR including total, externalizing, internalizing, social, and attention problems.</li> <li>• From pre-test to posttest children improved on objective sustained attention and on Mindful awareness</li> <li>• From pre-test to posttest parents reported significant improvements on children's self-control</li> </ul>	<ul style="list-style-type: none"> <li>• Although the sample size was small, these children suffered from significant cognitive and behavioral problems</li> <li>• Several self-regulatory components were improved including attention, MAAS, and parent rated self-control</li> </ul>

Which behavior(s) need to be addressed to improve self-regulation?			
	<p>hours of training and provided</p> <ul style="list-style-type: none"> <li>• Paired t-tests, changes from waitlist to pretest, pretest to posttest, and posttest to follow up were reported</li> <li>• Youth Self Report (YSR) measuring internalizing, externalizing, social, thought, and attention problems.</li> <li>• Parents rated children on self-control using the Self Control Rating Scale (SCRC)</li> <li>• Youth were measured on sustained attention</li> <li>• Youth were also measured on awareness using the Mindful Attention and Awareness Scale (MAAS) which assesses self-regulation and well-being</li> </ul>	<ul style="list-style-type: none"> <li>• Long-term effects included (at 8-week follow-up) significant improvements on YSR total, externalizing, internalizing, social and attention problems, along with Mindful Awareness, sustained attention and parents reporting on children's self-control.</li> </ul>	

Which behavior(s) need to be addressed to improve self-regulation?			
(Weijer-Bergsma, Formsma, Bruin, & Bogels, 2011)	<ul style="list-style-type: none"> <li>• MM, 8 adolescent completers (mean age 13.4) with ADHD and their parents</li> <li>• Training occurs in groups of 4 to 6 adolescents, 8 weekly sessions of 1.5 hours.</li> <li>• 8 weeks after the last session, adolescents and parents followed a joined booster session.</li> <li>• The treatment is based on a Mindfulness in Schools Project.</li> <li>• Exercises include sitting meditation, body scan and breathing space.</li> <li>• Parents received a separate but parallel training.</li> <li>• A pre-experimental design was used with a pre-test one week before treatment, immediately after the 8-week training a posttest was administered, and two follow-up measures 8 and 16 weeks after posttest.</li> <li>• The Youth Self Report (YSR) was used.</li> <li>• The Child Behavior</li> </ul>	<ul style="list-style-type: none"> <li>• A borderline significant reduction in attention problems was reported by fathers but not by adolescents or mothers</li> <li>• At 8-week follow-up, fathers as well as adolescents reported a significant reduction in attention problems</li> <li>• Immediately after training, externalizing problems reduced significantly as reported by fathers but not by adolescents, mothers or tutors.</li> <li>• At 8-week follow-up, the reduction reported by fathers was maintained and adolescent reported a borderline significant reduction as well.</li> <li>• Fathers reported a borderline significant reduction in internalizing problems after training but not by adolescents and mothers or tutors.</li> <li>• At 8-week follow-up this was maintained by fathers.</li> <li>• Metacognition problems reduced borderline significantly as reported by tutors but not fathers or mothers</li> <li>• At 8-week follow-up, fathers reported a significant reduction in Metacognition problems.</li> <li>• ANT=After training, adolescents showed a significant reduction in</li> </ul>	<ul style="list-style-type: none"> <li>• Directly after training adolescents' externalizing, internalizing and attention problems reduced, and executive functioning improved on self-report</li> <li>• Reported improvements were confirmed by enhanced performance on the computerized attention tests.</li> <li>• 8-week follow-up revealed reductions in problem behaviors and improvements in executive functioning being maintained and becoming stronger.</li> </ul>

Which behavior(s) need to be addressed to improve self-regulation?			
	<p>Checklist (CBCL) was used by parents to assess their child's attention problems, Internalizing and Externalizing problems</p> <ul style="list-style-type: none"> <li>• The Teacher Report Form (TRF) was used by teachers to report attention problems, Internalizing and Externalizing problems of children.</li> <li>• Parents and tutors rated adolescents' executive functioning on the Behavior Rating Inventory of Executive Functioning (BRIEF)</li> <li>• MAAS was self-reported by adolescents and parents.</li> <li>• Adolescents performed three computerized tasks, a baseline speed task and two sustained attention tasks,</li> <li>• Changes from pretest to posttest and pretest to follow-up were analyzed by means of paired-t-tests.</li> </ul>	<p>reaction speed but did no improvements were made in baseline speed or sustained attention auditory.</p> <ul style="list-style-type: none"> <li>• At 8-week follow-up, reaction speed did not improve significantly, but the reduction in false alarms was only borderline significant whereas the number of misses reduced significantly</li> </ul>	

Which behavior(s) need to be addressed to improve self-regulation?			
(Tang et al., 2007)	<ul style="list-style-type: none"> <li>• Meditation (IBMT), 80 Chinese undergraduate students, 40 experimental, 40 treatment (mean age 21.8)</li> <li>• Students were randomized to either a relaxation training group (control) or an IBMT group.</li> <li>• IBMT involves body relaxation, mental imagery, and mindfulness meditation training. Groups received 20 minutes of training for 5 days</li> <li>• 1-week before the intervention and immediately following, participants took the Attention Network Test (ANT) measuring orienting, alerting, and ability to resolve conflict (executive attention), the Ravens Progressive Standard Matrix (a standard culture fair intelligence test), and the Profile of Mood States (POMS), a stress test and measures of cortisol.</li> </ul>	<ul style="list-style-type: none"> <li>• ANOVA's found significant differences in the ANT only for conflict resolution (executive attention) (9.859, <math>p &lt; .01</math>) in the IBMT group.</li> <li>• The group x session interaction indicated that the before vs. after difference in the conflict resolution was significant only for the trained group (10.839, <math>p &lt; .01</math>).</li> <li>• Better self-regulation of emotion was identified by the POMS. The ANOVA's revealed a group x session effect for anger-hostility (5.558, <math>p &lt; .05</math>), tension-anxiety (11.920, <math>p &lt; .01</math>) and vigor-activity (7.749, <math>p &lt; .01</math>).</li> <li>• T-test indicated there were significant differences in the experimental group (but not the control group) demonstrating short-term IBMT can enhance positive mood and reduce negative ones.</li> <li>• In previous work the network associated with executive attention has been related to intelligence. To test this the Raven's Matrices ANOVA's revealed significant improvements (10.171, <math>p &lt; .01</math>). The t-tests showed a significant improvement in the experimental group after training (<math>p &lt; .001</math>).</li> </ul>	<ul style="list-style-type: none"> <li>• The authors noted in the introduction that conflict monitoring seems to me more influential than orienting and alerting for achievement in educational settings.</li> <li>• Authors also note in the introduction that adolescence may provide a window of opportunity for meditation to take its full effect because of the plasticity of the brain.</li> <li>• Alerting and conflict monitoring differed between the CMT and control group.</li> <li>• The authors concluded that the centrality of attention for academic achievement, protracted development of attention during childhood, and vulnerability of this cognitive system to environmental challenges all promote enthusiasm for improving attention by various means-including contemplative training methods which were investigated here.</li> </ul>

Which behavior(s) need to be addressed to improve self-regulation?			
(Baijal, Jha, Kiyonaga, Singh, & Srinivasan, 2011)	<ul style="list-style-type: none"> <li>Two groups of school aged children (13-15) from two schools offering Concentrative Meditation (CMT) as part of their regular academic curriculum (N=79) were compared to a group of children from one school not offering CMT (N=76) in India.</li> <li>The 13 year olds (N=29) at the CMT school had received relaxation training during the prior year, had had spent at least a few months practicing meditation.</li> <li>The 14- (N=26) and 15 year olds (N=24) in the CMT group had received training in Transcendental Meditation (TM) for an average of at least 1 and 2 years respectively which involved daily exercises of 10 minutes, twice a day, involving a silent mantra (sound) chanting as an object of meditation performed in a group setting at the school.</li> </ul>	<ul style="list-style-type: none"> <li>Conducted univariate analyses of covariance (ANCOVA). DV's of subsystem differences (alerting, orienting, or conflict monitoring) for both RT and accuracy, the fixed factor group (CMT vs. control) and the covariate of age (13-15 year olds).</li> <li>The ANCOVA's for alerting revealed no main effect of age, but did reveal a main effect of group for both reaction time and accuracy (low RT and higher accuracy for CMT).</li> <li>The ANCOVA for orienting revealed no main effects of age or group for either RT or accuracy.</li> <li>The ANCOVA for conflict monitoring revealed a main effect of age for RT and accuracy and group for both RT and accuracy. Conflict monitoring scores were smaller in Older vs. younger and CMT vs. control group suggesting greater developmental maturity and CMT both improve conflict monitoring ability</li> <li>Further analysis of conflict adaptation suggest that conflict monitoring was more efficient in the CMT vs. control group for previous congruent trials.</li> </ul>	<ul style="list-style-type: none"> <li>The authors noted in the introduction that conflict monitoring seems to me more influential than orienting and alerting for achievement in educational settings.</li> <li>Authors also note in the introduction that adolescence may provide a window of opportunity for meditation to take its full effect because of the plasticity of the brain.</li> <li>Alerting and conflict monitoring differed between the CMT and control group.</li> <li>The authors concluded that the centrality of attention for academic achievement, protracted development of attention during childhood, and vulnerability of this cognitive system to environmental challenges all promote enthusiasm for improving attention by various means- including contemplative training methods which were investigated here.</li> </ul>



Which behavior(s) need to be addressed to improve self-regulation?			
	<ul style="list-style-type: none"> <li>• The control group participants (N=76) were recruited from a different public school, which did not provide any other form of MT.</li> <li>• Quasi-experimental, cross-sectional, non-randomized design</li> <li>• All students performed the Attention Network Test (ANT) which test alerting, orienting, and conflict monitoring</li> </ul>		
(Tang, Tang, Jiang, & Posner, 2014)	<ul style="list-style-type: none"> <li>• IBMT, 208 students, 104 experimental, 104 treatment (mean age 15.5)</li> <li>• Students were randomized to either a relaxation training group (control) or an IBMT group.</li> <li>• Groups received 20 minutes per day from Monday through Friday for 6 weeks (10 hours total).</li> <li>• Participants took the Attention Network Test (ANT) measuring orienting, alerting, and ability to resolve conflict</li> </ul>	<ul style="list-style-type: none"> <li>• T-tests were conducted to examine the main effect of ANT, Raven's Matrices, POMS, PSS</li> <li>• IBMT improved both executive and alerting attention indicating the greater self-control and sustained attention ability.</li> <li>• IBMT showed a significant improvement in Raven's scores indicating IBMT can improve Raven's score.</li> <li>• A number of POMS scales improved in IBMT group indicating short-term IBMT can enhance positive moods, and reduce negative ones</li> <li>• PSS improved in IBMT but not the other group</li> <li>• The academic achievement indexed by the final mean of grades of Literacy, Math,</li> </ul>	<ul style="list-style-type: none"> <li>• 10 hours of IBMT can improve attention, emotion, and Raven scores while also improving in academic performance in scores of literacy, math, and second language learning.</li> </ul>

Which behavior(s) need to be addressed to improve self-regulation?			
	(executive attention) <ul style="list-style-type: none"> <li>• The Ravens Standard Progressive Matrix (a standard culture fair intelligence test)</li> <li>• Profile of Mood States (POMS)</li> <li>• Perceived Stress Scale (PSS)</li> </ul>	Second language (English) significantly improved following IBMT. <ul style="list-style-type: none"> <li>• After training, we also conducted t-test to examine the behavioral and grade changes between the two groups, and found significance in IBMT group compared to RT group.</li> </ul>	
(Zoogman, Goldberg, Hoyt, & Miller, 2014)	<ul style="list-style-type: none"> <li>• Mindfulness (that include Mindfulness Meditation) with youth under 18 years of age.</li> <li>• Meta-Analysis of Mindfulness interventions with youth published through July 2011.</li> <li>• Mindfulness was chief component intervention.</li> <li>• Inclusion criteria included published studies in peer-reviewed journal in English.</li> <li>• participants were under the age of 18 years of age at initial assessment</li> <li>• Electronic databases included: PsychINFO, MEDLINE, JSTOR, Social Work Abstracts, SocINDEX with full test, ERIC,</li> </ul>	<ul style="list-style-type: none"> <li>• 20 articles remained after screening for meta-analysis</li> <li>• Most interventions were done in schools and the age range was 6-21 years old.</li> <li>• Most used non-clinical samples while four studies used clinical samples.</li> <li>• Primary effect size was statistically significant (<math>d=.227</math>, 95% CI [.148,.305], <math>p&lt;.0001</math>), indicating that on average, the mindfulness condition showed significantly greater improvement on outcome measures than active control conditions. This <math>d</math> is considered small but significant.</li> <li>• Studies drawn from clinical sample reported significantly higher effect sizes (<math>d=.5</math>) compared to non-clinical samples (<math>d=.197</math>).</li> <li>• For mindfulness and attention measures <math>d=.280</math>, 95% CI</li> </ul>	<ul style="list-style-type: none"> <li>• It was found that measures of psychological symptoms yielded higher effects than other outcome types.</li> <li>• Authors noted that the sub-analysis for attention and mindfulness measures, mindfulness interventions were shown to directly increase mindfulness and attention (<math>d=.280</math>) which was the first time this was shown in a meta-analysis.</li> <li>• The authors speculate that attention may be the internal psychological mechanism that transmits the effects of mindfulness interventions based upon previous research showing attention to improve through mindfulness practice (Cahn and Polich, 2006).</li> </ul>

Which behavior(s) need to be addressed to improve self-regulation?			
	<p>Sociological Abstracts, Scopus, Web of Knowledge and Cochrane</p> <ul style="list-style-type: none"> <li>• Becker's (1988) del served as the primary effect size used in effect size aggregation and omnibus analyses</li> <li>• Five separate sub-meta-analyses were conducted using effect sizes from only objective measures, only non-objective, psychological symptoms, measures not of psychological symptoms, and measures of mindfulness and attention.</li> </ul>	<p>[.069,.490], <math>p=.009</math> which is significant</p>	
<p>(Broderick &amp; Metz, 2009)</p>	<ul style="list-style-type: none"> <li>• MM (Learning to BREATHE Curriculum), the entire senior class of an all-girls school (N=105, mean age=17.4) served as treatment group, while two sections of juniors (N=17, mean age=16.4) from the same school served as the control group (Only 17 were usable)</li> <li>• Learning to BREATHE</li> </ul>	<ul style="list-style-type: none"> <li>• Between group comparisons revealed, program participants demonstrated a significant reduction in negative affect (according to PANAS) when compared to the control group.</li> <li>• Program participants demonstrated a significant increase in feeling calm/relaxed/self-accepting when compared to the control group (an added item to the PANAS).</li> <li>• Within group analysis revealed for the</li> </ul>	<ul style="list-style-type: none"> <li>• Increase in emotion regulation after the program as measured by the DERS.</li> </ul>

Which behavior(s) need to be addressed to improve self-regulation?			
	<p>curriculum which include 6 lessons linked to school health standards each of which include MM</p> <ul style="list-style-type: none"> <li>• Classes were delivered twice a week</li> <li>• Non-randomized pre-test/post-test design</li> <li>• Pre/quasi-experimental</li> <li>• Assessments included Positive and Negative Affect Schedule (PANAS), Difficulties in Emotion Regulation Scale (DERS), Ruminative Response Scale (RRS)</li> <li>• Somatization Index of the Child Behavior Checklist (SIBC)</li> <li>• Chi-square and independent t-tests were calculated to detect statistical pre-test differences between the program and control groups</li> <li>• Mean gain scores (post-test – pre-test) and t-tests were used to assess program effectiveness</li> </ul>	<p>program group a statistically significant decline from pre-test to post-test in negative affect (PANAS) and an increase in feeling calm/relaxed/self-accepting.</p> <ul style="list-style-type: none"> <li>• Within group analysis revealed for the program group a significant decline in the total difficulty in emotion regulation (DERS) score, lack of emotional awareness DERS subscale, and the lack of emotional clarity DERS subscale.</li> </ul>	

Which behavior(s) need to be addressed to improve self-regulation?			
(Metz et al., 2013)	<ul style="list-style-type: none"> <li>• MM (Learning to BREATHE Curriculum), convenience sample drawn from two public high schools in Philadelphia, 216 students were in either the control group (87 total, mean age 16.4) or treatment group (129 total mean age 16.5)</li> <li>• Learning to BREATHE curriculum was taught in a choir class</li> <li>• 18 lessons were delivered once a week for 16 weeks.</li> <li>• The choir teacher implemented the lessons.</li> <li>• Quasi-Experimental pre-test/post-test comparison group design</li> <li>• DERS assessed the ability to regulate emotions</li> <li>• Psychosomatic Complaint Scale assessed how often the student experienced psychosomatic complaints such as headaches, difficulty concentrating, worry, and fatigue</li> </ul>	<ul style="list-style-type: none"> <li>• The Leven's test (MANOVA) on the total DERS was found to be significant</li> <li>• The initial multivariate test was significant, Pillai's trace, suggesting that Learning to BREATHE program participants had at least one or more mean vector pairing that produced a significant difference between treatment and comparison groups and that approximately 12% of multivariate variance of the dependent variables is associated with the group factor</li> <li>• Results of ANOVA testing revealed program participants experienced more of a reduction in limited access to regulation strategies, lack of clarity, and in total DERS scale score when compared to the comparison group</li> <li>• The program group reported a mean reduction in the lack of emotional awareness DERS subscale vs. the comparison group which did not change</li> <li>• Program participants reported a larger reduction in psychosomatic symptoms from pretest to posttest as compared to the comparison group</li> <li>• Program participants demonstrated more of an improvement in the</li> </ul>	<ul style="list-style-type: none"> <li>• Results of this study support the hypothesis that Learning to BREATHE has a positive effect on measures of emotional regulation, self-regulation efficacy, psychosomatic complaints, and self-report stress level</li> </ul>

Which behavior(s) need to be addressed to improve self-regulation?			
	<ul style="list-style-type: none"> <li>• A single item was used to measure stress level</li> <li>• ASRES was created by the developer to measure self-efficacy in emotion regulation</li> <li>• Chi-squared tests (for categorical variables) and independent t-tests (for continuous variables) were computed to assess statistical differences on pretest indicators between program groups</li> <li>• Mean gain scores were computed and treated as the primary dependent variables. MANOVA was used to detect any main program effects on subscale mean gain scores</li> <li>• To determine the effects of group assignment on specific subscale measures, a series of univariate ANOVA's were performed</li> </ul>	overall self-regulation efficacy	

Which behavior(s) need to be addressed to improve self-regulation?			
(Schonert-Reichl & Lawlor, 2010)	<ul style="list-style-type: none"> <li>• MM (Mindfulness Education Program), 246 4<sup>th</sup> through 7<sup>th</sup> grade students drawn from 6 ME program classrooms (139 students) and 6 comparison classrooms (107 students) in a different school (mean age=11.43)</li> <li>• The Mindfulness Education (ME) program is a classroom-based universal preventive intervention designed to foster children's positive emotions, self-regulation, and goal-setting.</li> <li>• Components include: Universal involvement of all children, a 10-lesson manualized curriculum with lessons grounded in theory and research, an emphasis on extending the key components to other aspects of life outside of school</li> <li>• Central to the program is Mindfulness</li> </ul>	<ul style="list-style-type: none"> <li>• Students in the program group showed significant increases in optimism from pretest to posttest compared to control students, who decreased in optimism.</li> <li>• Students in the program group demonstrated a positive statistical trend for positive affect in contrast to those in the control condition.</li> <li>• There were no differences in negative affect between the program and control groups.</li> <li>• Preadolescents in the program group improved in self-concept vs. controls. Early adolescents in the program group decreased in self-concept vs. controls who increased in self-concept.</li> <li>• Posttest teachers in the intervention classrooms described their students as significantly more attentive, emotionally regulated, and socially and emotionally competent than did teachers in the control classrooms.</li> <li>• Significant improvements (decreases) in Aggression and Oppositional/Dysregulated Behavior also emerged among students who received the ME program in contrast to controls.</li> </ul>	<ul style="list-style-type: none"> <li>• The authors noted the robust findings for two of the four dimensions of teacher-rated social emotional competence being attention/concentration and social emotional competence.</li> <li>• Program participants demonstrated significant improvements in the positive emotion of optimism.</li> <li>• Improvements in aggression and oppositional/dysregulated behavior were observed by teachers.</li> </ul>

Which behavior(s) need to be addressed to improve self-regulation?			
	<p>Meditation practice in a sitting position with the intention of enhancing children's self-awareness, focused attention, self-regulation, and stress reduction.</p> <ul style="list-style-type: none"> <li>• The ME program lessons were taught approximately once a week, with each lesson lasting 40-50 minutes and the daily core meditations were practiced three times a day for at least 3 minutes each session</li> <li>• Quasi-experimental design with pre/posttest and a treatment and wait-list control condition.</li> <li>• PANAS was used to measure positive and negative affect.</li> <li>• Classroom teachers completed the Teachers' Rating Scale of Social Competence (TRSC) to assess school-related social and emotional competence</li> </ul>	<ul style="list-style-type: none"> <li>• The overall effect size was .273 which would be considered a large effect.</li> <li>• Effect sizes for changes in behavioral dysregulation, attention and concentration and aggression were moderate.</li> <li>• Effect size improvements in social and emotional competence was large.</li> </ul>	



Which behavior(s) need to be addressed to improve self-regulation?			
	<ul style="list-style-type: none"> <li>• Effects of the program were examined using generalized linear model analysis of covariance.</li> <li>• Partial eta squared effect sizes were calculated to provide information about the magnitude of program effects beyond statistical significance.</li> </ul>		
(Barnert, Himelstein, Herbert, Garcia-Romeu, & Chamberlain, 2014)	<ul style="list-style-type: none"> <li>• MM 29 incarcerated males (mean age 16.3)</li> <li>• Participants received a 10-week curriculum that combined meditation with group process activities (30-minutes meditating and 60-minutes discussing meditation-related concepts).</li> <li>• The intervention group (n=16) also experienced a 7-hour retreat session.</li> <li>• MAASA-A (Adolescents), which measures attention and awareness in the present moment</li> <li>• Healthy Self-Regulation Scale</li> </ul>	<ul style="list-style-type: none"> <li>• To evaluate the effectiveness of the retreat, we calculated change scores on the MAASA-A, HSR, TCS and PSS-10 and an independent sample t-test to compare treatment and control groups.</li> <li>• The retreat group did not differ significantly from the control condition on these markers.</li> <li>• To assess the effect of the overall meditation program, we then collapse treatment and control conditions. A paired t-test demonstrated a significant increase in self-regulation among all participants' post-course compares with pre-course.</li> <li>• Mindfulness, impulsivity and perceived stress did not reach statistical</li> </ul>	<ul style="list-style-type: none"> <li>• The 10-week meditation program for incarcerated males was able to promote self-regulation as evidenced by quantitative measures, and self-discipline as evidenced by qualitative analysis.</li> </ul>

Which behavior(s) need to be addressed to improve self-regulation?			
	<p>(HSR) which measures adolescents' ability to self-regulate emotional responses</p> <ul style="list-style-type: none"> <li>• Teen Conflict Survey-Impulsiveness Subscale (TCS) assesses impulsiveness among adolescents</li> <li>• Perceived Stress Scale (PSS) assesses self-appraisal of stressful situations in the prior month of the participant's daily life.</li> </ul>	<p>significance but demonstrated psychological enhancement.</p> <ul style="list-style-type: none"> <li>• Six themes emerged from qualitative analysis of focus groups: Enhanced well-being, increased self-discipline, increased social cohesiveness, expanded awareness, resistance to meditation and future meditation practice.</li> </ul>	
(Quach, Mano, & Alexander, 2016)	<ul style="list-style-type: none"> <li>• MM (172 adolescents) (mean age 13.18)</li> <li>• Students were randomized to either the MM, hatha yoga, or control group (regular PE).</li> <li>• Group received two 45-minute sessions of MM each week for 4 weeks with a total of 8 sessions</li> <li>• Automated Operation Span Task (AOSPAN) is a computerized task used to measure Working</li> </ul>	<ul style="list-style-type: none"> <li>• Results indicated that the MM group reported significant pre-post improvements in WMC whereas participants in the hatha yoga and control groups did not.</li> <li>• All three groups showed a reduction in stress according to the PSS from pre- to post-intervention.</li> <li>• All three groups showed a reduction in anxiety according to the SCARED measure from pre- to post intervention.</li> </ul>	<ul style="list-style-type: none"> <li>• Results from this study suggest that MM may be an effective approach for improving WMC in adolescents, which to date has only been investigated in adults.</li> <li>• These results are consistent with the notion that the practice of meditation-which requires sustained attention while simultaneously redirecting attention back to the current experience is closely related to the function of working memory.</li> </ul>

Which behavior(s) need to be addressed to improve self-regulation?			
	<p>Memory Capacity.</p> <ul style="list-style-type: none"> <li>• PSS-10 measures perceived stressful situations that occur in daily life.</li> <li>• Screen for Child Anxiety and Related Emotional Disorders (SCARED) measures anxiety disorders as described in DSM-IV</li> </ul>		
(Urry, Roeser, Lazar, & Poey, 2012)	<ul style="list-style-type: none"> <li>• 27 Undergraduate students (13 female) ages 18-21 years old.</li> <li>• Participants viewed a set of 48 digital color photos designed to elicit either pleasant (24) or unpleasant (24) emotional states.</li> <li>• During viewings, participants were directed to either enhance emotional state, suppress emotional state, or view.</li> <li>• Amount of meditation practice and well-being were assessed.</li> <li>• PANAS was used to measure positive and negative affect.</li> <li>• Functional Magnetic Resonance Imaging (fMRI) data were also acquired.</li> </ul>	<ul style="list-style-type: none"> <li>• Higher reported levels of meditation practice were associated with higher levels of activation in the left lateral prefrontal cortex (<math>r=.40</math>, <math>p=.042</math>) and dorsal medial prefrontal cortex (DMPFC) (<math>r=.41</math>, <math>p=.036</math>) while participants regulated their positive emotions.</li> <li>• Higher prefrontal cortex activation in the left lateral prefrontal cortex while participants regulated their positive emotions was associated with marginally higher levels of reported positive affect (PA) (<math>r=.35</math>, <math>p=.070</math>) which was also true for the DMPFC (<math>r=.38</math>, <math>p=.052</math>).</li> </ul>	<ul style="list-style-type: none"> <li>• According to this study meditation practice is positively associated with well-being by virtue of their association with emotion regulation.</li> <li>• Higher reported levels of meditation practice were associated with higher levels of PFC activation when regulating pleasant emotions. Higher levels of PFC activation, in turn, were also associated with higher levels of positive affect in daily life.</li> <li>• Results suggest that greater cognitive control exerted during emotion regulation, as evidenced by greater PFC activation, may be both an outcome of meditation and a “cause” of higher well-being.</li> </ul>

Which behavior(s) need to be addressed to improve self-regulation?			
(Tang et al., 2009)	<ul style="list-style-type: none"> <li>• IBMT, 86 Chinese undergraduate students were randomized to either experimental or control group (Experiment I 23:23, Experiment II 20:20) (mean age 21.45)</li> <li>• Experiment I used brain imaging and physiological measures, and Experiment II used EEG and physiological measures</li> <li>• Experimental groups continuously attended IBMT for 5 days/20 minutes per day. The control group did the same amount of muscle relaxation training sessions.</li> <li>• Experiment I: Neuroimaging data was collected using GE SPECT scanner. Further analysis utilized ANOVA and t-tests</li> <li>• Experiment II: EEG was recorded using the Brain Products System and Pearson's</li> </ul>	<ul style="list-style-type: none"> <li>• Experiment I=After training the t-test revealed increases in the IBMT group (not the relaxation group) in EEG power in the theta frequency band for frontal midline electrodes often related to generators in the ACC.</li> <li>• Experiment II=The IBMT group showed more regional blood flow in the right ACC, left insula, occipital lobule, right posterior cingulate cortex and others.</li> </ul>	<ul style="list-style-type: none"> <li>• IBMT showed greater change in ACC which is a brain region that has been related to emotion regulation</li> <li>• Greater subgenual ACC and adjacent ventral ACC activity may play an increased regulatory role during and after IBMT.</li> <li>• "The concurrent increase in activation in the subgenual ACC and left insula was consistent with previous findings of the distribution of Von Economo neurons in these 2 brain areas and their connectivity in the resting state. These 2 regions may provide an anatomical base for successful self-regulation."</li> </ul>

Which behavior(s) need to be addressed to improve self-regulation?			
(Tang et al., 2010)	<ul style="list-style-type: none"> <li>• IBMT, 45 American undergraduate students were randomized to either experimental (IBMT) or control (RT) (22:23) (mean age 20.58)</li> <li>• Groups received 30 minutes of training each night for 1 month (total of 11 hours)</li> <li>• Diffusion tensor imaging used to measure brain changes</li> <li>• Between group t-tests were utilized</li> <li>• Voxel-based morphometry</li> <li>• ANOVA's were utilized</li> </ul>	<ul style="list-style-type: none"> <li>• Found fractional anisotropy (FA) increases (largest) in the left anterior corona radiata indicating white matter changes in this region were due to the IBMT training</li> <li>• No significant differences were found between pre- and post-test for the relaxation training group</li> </ul>	<ul style="list-style-type: none"> <li>• "11 hours of IBMT can induce changes in FA in the anterior corona radiata of the ACC a key node of self-regulation network."</li> <li>• FA in the ACR is a white matter tract associated with the ACC</li> </ul>
(Xue, Tang, & Posner, 2011)	<ul style="list-style-type: none"> <li>• IBMT 32 Chinese undergraduate students were randomized to either experimental (IBMT) or control (RT) (15:17) (mean age 21.44)</li> <li>• Groups received 30 minutes of training Monday-Friday for 1 month (total of 11 hours)</li> <li>• Network analysis approach based</li> </ul>	<ul style="list-style-type: none"> <li>• After 1 month of training, nodal efficiency showed a significant increase in left ACC after IBMT but not RT.</li> <li>• The left ACC had a greater nodal degree value after IBMT.</li> <li>• A higher-ranked position in the left ACC after IBMT was found.</li> </ul>	<ul style="list-style-type: none"> <li>• "The ACC is a key node of the brain's self-regulation system and its changes in topographical properties are likely to provide a mean for cognitive, emotional, social and behavioral development."</li> <li>• Results from this study indicate an increased network efficiency and degree of the ACC after 11 hours of IBMT.</li> <li>• An increased connectivity degree</li> </ul>

Which behavior(s) need to be addressed to improve self-regulation?			
	<p>on graph theory used</p> <ul style="list-style-type: none"> <li>• MRI was used to measure brain structures</li> <li>• Linear regression was used for partial correlation analysis</li> <li>• Partial correlation can be used as a measure of the functional connectivity between a given pair of regions.</li> </ul>		<p>indicated that the ACC had more direct influences on other regional nodes in brain functional networks.</p>
<p>(Tang, Lu, Fan, Yang, &amp; Posner, 2012)</p>	<ul style="list-style-type: none"> <li>• IBMT, 68 Chinese undergraduate students were randomized to either experimental (IBMT) or control (RT) (34:34) (mean age 20.52)</li> <li>• Groups received 30 minutes of training Monday-Friday for 2 weeks (total of 5 hours)</li> <li>• Diffusion Tensor Imaging scans were used.</li> <li>• FA and Axial Diffusivity (AD) maps calculated using DTIFit within FDT. The Radial Diffusivity (RD) map was computed.</li> <li>• T-tests for pre and post-training</li> </ul>	<ul style="list-style-type: none"> <li>• In a previous study, it was found that in areas where FA increased (anterior corona radiata) it involved simultaneous decreases of AD and RD. The second pattern was FA increase accompanied by only a decrease in RD (Tang et al 2010).</li> <li>• In the current study a significant decrease in AD was found in the corpus callosum, corona radiata, superior longitudinal fasciculus, posterior thalamic radiation, and sagittal stratum using a whole-brain analysis with a correction for multiple comparisons, but changes in FA and RD did not reach significance</li> <li>• T-tests showed significant reductions in anger-hostility, confusion-</li> </ul>	<ul style="list-style-type: none"> <li>• It is likely that improved self-regulation following IBMT may be mediated by the increase of communication efficiency between ACC and other brain areas</li> <li>• With IBMT typically two patterns of change were seen: In pattern 1 both AD and RD decrease, and in pattern 2 only RD decreases</li> <li>• The present results imply that enhanced integrity of white matter fibers by IBMT may be caused by increased numbers of brain fibers or increased axonal caliber</li> <li>• The dynamic pattern of white matter change involving the ACC, a part of the brain network related</li> </ul>

Which behavior(s) need to be addressed to improve self-regulation?			
	<p>differences with a correction for multiple comparisons. Pearson correlation was used to analyze correlation between imaging metrics and behavioral assessments</p> <ul style="list-style-type: none"> <li>• POMS was used to measure behavioral/mood changes</li> </ul>	<p>bewilderment, depression-dejection, fatigue-inertia, and total mood disturbance</p> <ul style="list-style-type: none"> <li>• The training-induced changes in mood were correlated with the brain changes found</li> </ul>	<p>to self-regulation, could provide a means for intervention to improve or prevent mental disorders</p>
(Tang, Lu, Feng, Tang, & Posner, 2015)	<ul style="list-style-type: none"> <li>• IBMT 40 Chinese undergraduate students randomized to either experimental (IBMT) or control (RT) (20:20) (mean age 22.75)</li> <li>• Groups received 30 minutes of training each night for 1 week (total of 2.5 hours)</li> <li>• Single photon emission computed tomography (SPECT) scanner was used to detect Cerebral Blood Flow (CBF) before and after training</li> <li>• Sample t-tests were used along with ANCOVA</li> <li>• PANAS was used to measure mood.</li> </ul>	<ul style="list-style-type: none"> <li>• Post training, the IBMT group showed significantly better scores on the PANAS</li> <li>• Post-training the IBMT group and not the relaxation group had significantly more CBF to subgenual/adjacent ventral anterior cingulate cortex, medial prefrontal cortex, and insula.</li> </ul>	<ul style="list-style-type: none"> <li>• ACC, insula and self-regulation</li> <li>• The results from this study showing greater CBF to ACC, PFC, and insula, demonstrates that IBMT works by improving self-regulation.</li> </ul>

**Evidence Table D: Prevalence of Health Behavior**

<b>How many adolescents use meditation nationwide?</b>				
<b>Author(s) &amp; Date</b>	<b>Behavior &amp; Priority Group</b>	<b>Research Method</b>	<b>Relevant Findings</b>	<b>Comments Including other findings</b>
(Black, Clark, Barnes, Stussman, & Nahin, 2015)	Children ages 4-17 years old	<ul style="list-style-type: none"> <li>• Data comes from the 2012 Complementary and Alternative (CAL) supplement of National Health Information Survey (NHIS).</li> <li>• NHIS is a household survey conducted continuously throughout the year for the Centers for Disease Control and Prevention's (CDC) National Center for Health Statistics by interviewers from the U.S. Census Bureau</li> <li>• The Sample Child Core obtains information on the health of one randomly selected child in the family.</li> <li>• For sample children, information is provided by a knowledgeable adult family member residing in the household.</li> <li>• Children include young people ages 4-17 years old.</li> <li>• Final sample size includes 10,218 children in 2012.</li> </ul>	<ul style="list-style-type: none"> <li>• Approximately 1.6% of children in the study reported using any form of meditation in the past 12 months prior to the survey.</li> <li>• Commonly used forms of meditation include spiritual (.5%), mindfulness (.3%), mantra (.2%), and using in as part of a yoga, tai chi, or qi gong (1.3%).</li> </ul>	Most recent and only research documenting how many young people meditate nationwide.



**Evidence Table E: Formative Research on Determinants of Behavior**

<b>What are the intrapersonal &amp; environmental factors associated with meditation in adolescents?</b>				
<b>Author(s) &amp; Date</b>	<b>Behavior &amp; Priority Group</b>	<b>Research Method</b>	<b>Findings on Determinants</b>	<b>Comments Including other findings</b>
(Lederer & Middlestadt, 2014)	Meditation within University Population	<b>Mixed Methods</b> <ul style="list-style-type: none"> <li>• Instrument was developed from Reasoned Action Approach, piloted and revised</li> <li>• N=96 college students (18 years and older) and staff during the spring semester of 2012</li> <li>• Participants were recruited through e-mail requests, announcements in courses, word of mouth and flyers at community locales</li> <li>• Hard copy of instrument was given to undergraduate health course to increase sample size</li> <li>• 72 online respondents and 24 hard copy</li> </ul>	<b>Determinants Associated with Behavior</b> <ul style="list-style-type: none"> <li>• The 3 global constructs predicted <u>intention</u> to meditate with <math>R^2</math> of .632 meaning the constructs accounted for 63% of the variance in intention.</li> <li>• Pearson's r included the following: Perceived Behavioral Control-.666, Perceived Norm-.601, Attitude-.575).</li> <li>• Time and Place (<u>Perceived Behavioral Control</u>); Many respondents identified having more time to meditate as a facilitator and having too many things to do as a barrier. Respondents also identified having a quiet place to meditate would make it easier and not having would be harder</li> <li>• Friends and Family (<u>Subjective Norm</u>); Family and friends were most frequently identified as being the people to approve of the respondents meditating. The majority of participants believed that no one would disapprove</li> <li>• Reduce Stress and Taking Time(<u>Attitude</u>): Meditation reducing stress was the most common benefit, and it taking time was common disadvantage</li> </ul>	Although this was in a university setting, some respondents were close to the adolescent age group.

What are the intrapersonal & environmental factors associated with meditation in adolescents?				
Author(s) & Date	Behavior & Priority Group	Research Method	Findings on Determinants	Comments Including other findings
(Williams, Dixon, McCorkle, & Van Ness, 2011)	Meditation barriers as identified by literature review and meditation teachers.	<b>Qualitative</b> <ul style="list-style-type: none"> <li>•The researchers' goal was to develop an instrument used to identify determinants (barriers) of meditation practice</li> <li>•To delineate content domains it entailed a focused literature review followed by qualitative individual interviews with 4 meditation teachers</li> <li>•Using gathered data 2 authors developed operational definitions for the domains</li> <li>•Initial item generation was tested for content validation from expert panel that consisted of 5 members.</li> <li>•Estimated content validity using a community-based sample (22 items) with 10 non-meditators provided thoughtful commentary.</li> <li>•Based on the Theory of Planned Behavior, two other instruments were chosen to test for convergence with the DMPI.</li> </ul>	<b>Determinants Associated with Behavior</b> <ul style="list-style-type: none"> <li>• Perceptions and misconceptions (<u>Attitudes</u>); Through a literature search and interviews with meditation teachers, perceptions and misconceptions was one of the domains identified for the DMPI which included presumed outcomes and physical, mental and emotional constraints.</li> <li>• Sociocultural Beliefs (<u>Subjective Norm</u>); Through a literature search and interviews with meditation teachers, sociocultural beliefs was one of the domains identified for the DMPI which included family and friend support and religious beliefs.</li> <li>• Pragmatic Concerns (<u>Perceived Behavioral Control</u>); Through a literature search and interviews with meditation teachers, pragmatic concerns was one of the domains identified for the DMPI which included time, environment, priorities, and intrinsic/extrinsic motivation.</li> </ul>	Although this study focused on the development of an instrument, it was theory-based and used a literature review along with meditation teachers' perceptions of the barriers to meditation who may work with adolescents.

What are the intrapersonal & environmental factors associated with meditation in adolescents?				
Author(s) & Date	Behavior & Priority Group	Research Method	Findings on Determinants	Comments Including other findings
(Williams, Van Ness, Dixon, & McCorkle, 2012)	Meditation and cancer family caregivers	<p><b>Quantitative</b></p> <ul style="list-style-type: none"> <li>• Cross-sectional survey conducted at a Cancer Care Center using the Determinants of Meditation Practice Inventory (DMPI) to identify barriers to meditation practice.</li> <li>• Researchers were looking to identify the barriers to meditation for a highly stressed population of cancer family caregivers.</li> <li>• Theory of Planned Behavior (TPB) provided the foundation for the study design and methods including the study goals and selection of the variables of interest and outcome variables.</li> <li>• Sample size was N=150 with the age range being 18-84 years old.</li> </ul>	<p><b>Determinants Associated with Behavior</b></p> <ul style="list-style-type: none"> <li>• Prefer to be accomplishing something (<u>Attitudes</u>); One of the most common barriers identified using the DMPI was that people preferred to be accomplishing something which reveals the belief that meditation is unproductive and not very helpful.</li> <li>• Not knowing much about meditation (<u>Perceived Behavioral Control</u>); Another common barrier to meditation practice was people indicating they didn't know much about meditation and therefore this behavior is out of their control in the sense that they don't know how to meditate.</li> <li>• Not being able to stop thoughts (<u>Perceived Behavioral Control</u>): A third common response was that people were unable to stop their thoughts and therefore were unable to meditate. This relates directly to perceived behavioral control in that because people are unable to stop their thoughts they are therefore unable to meditate.</li> </ul>	Although this study Included a wide range of ages, some individuals included in this study were of adolescent age (6 students).

**Evidence Table F: Evaluations of Effectiveness of Interventions**

<b>What effective interventions have been tested to change meditation among adolescents?</b>					
<b>Author &amp; Date</b>	<b>Behavior &amp; Priority Group</b>	<b>Intervention Description</b> Determinants, theory, and strategies	<b>Evaluation Method</b> Design, data collection, sample type and size	<b>Findings on Effectiveness of Intervention</b>	<b>Comments</b>
(Sharma, 2001)	Meditation with Adults	<ul style="list-style-type: none"> <li>Self-efficacy was addressed from Social Cognitive Theory</li> <li>Intervention consisted of six 75-minute sessions meeting once per week, with participants given instructions to practice meditation at home. During the third week a type of meditation was taught and participants were encouraged to practice at home. Subsequent weeks would review the instructions and participants would be taught other forms of</li> </ul>	<ul style="list-style-type: none"> <li>A total of 31 participants completed the six-week course that consisted of 4 men and 27 women.</li> <li>Age range was from 21 to 68 (mean of 46.55).</li> <li>Data were collected one week before and one week after the intervention from all volunteers by means of a self-reported questionnaire.</li> <li>Data regarding meditation practice was collected on a self-reported past week recall of either never (0), hardly ever (1), sometimes (2), almost always (3), and always (4).</li> <li>Items measured</li> </ul>	<ul style="list-style-type: none"> <li>Past week yoga-related behaviors increased from pre-test mean of (range was 0-12) .55 to a post-test mean of 6.93 (p-value .0001).</li> <li>Meditation self-efficacy increased from pre-test mean of (range was 0-12) 1.19 to a post-test mean of 8.10 (p-value .0001).</li> </ul>	<ul style="list-style-type: none"> <li>Study utilized an adult sample but the use of yoga-related behaviors and increase of self-efficacy for meditation were both highly significant .</li> </ul>

		meditation. Participants were given detailed handouts and encouraged to continue daily self-practice.	self-efficacy to perform meditations.		
(Eggleston, Middlestadt, Lindeman, McCormich, & Kocaja, 2011)	Yoga with adults	<ul style="list-style-type: none"> <li>• Items measuring global constructs were based on a salient belief elicitation (pilot study)</li> <li>• Behavioral intention was measured with a statement about attending a yoga class each week for the next three months.</li> <li>• Attitude toward the behavior was measured with ratings of the phrase attending yoga class each week for the next three months</li> <li>• Subjective norm was defined as agreement with statements</li> </ul>	<ul style="list-style-type: none"> <li>• Sample consisted of 157 participants recruited through twelve yoga studios</li> <li>• Sample was predominantly female, white, college educated and lived with a partner.</li> <li>• Mean age of participants was 45.6</li> <li>• Regression analyses were conducted to identify multiple correlation, Pearson correlation, and beta weights.</li> <li>• Exploratory factor analysis was conducted to identify specific factors that measured attitude and perceived behavioral control.</li> </ul>	<ul style="list-style-type: none"> <li>• Intention and perceived behavioral control were significant predictors of attending yoga classes weekly.</li> <li>• All three constructs (Attitude, Subjective Norm, Perceived Behavioral Control) showed a statistically significant simple correlation with intention</li> <li>• The three global constructs explained 37.4% of the variance in intention</li> <li>• The weight for Perceived Behavioral Control</li> </ul>	<ul style="list-style-type: none"> <li>• Authors concluded that public health professionals could focus on increasing perceived behavioral control by having marketing messages that include empowerment, self-confidence and volitional control.</li> <li>• According to the results from this study, the most important theoretical construct related to attending yoga classes is perceived behavioral control</li> </ul>

		<p>about people important to them.</p> <ul style="list-style-type: none"> <li>• Perceived behavioral control was based on three different questions about ability and control over attending yoga classes.</li> </ul>		<p>was larger than weight for attitude.</p> <ul style="list-style-type: none"> <li>• The salient consequences of attending yoga classes were appropriate measures of attitude.</li> <li>• There were no normative beliefs or motivations to comply that were significant related to behavior although normative belief and motivation to comply were good measures of subjective norm.</li> </ul>	
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**Evidence/Reference Table G: Theory and Construct References**

<b>What theories or conceptual frameworks form the foundation of my research?</b>					
<b>Author &amp; Date</b>	<b>Theory/ Construct</b>	<b>Conceptualization</b>	<b>Operational Description</b>	<b>Measurement</b>	<b>Comments</b>
(Fishbein & Ajzen, 2010)	Reasoned Action Approach/ Intention	<ul style="list-style-type: none"> <li>• An aim or plan to perform a given behavior</li> </ul>	<ul style="list-style-type: none"> <li>• Measures include to ask if people intend to perform behavior</li> </ul>	<ul style="list-style-type: none"> <li>• ‘Meditating at least twice in the next week is-unlikely/ likely’</li> </ul>	<ul style="list-style-type: none"> <li>• Two items to measure</li> </ul>
(Fishbein & Ajzen, 2010)	Reasoned Action Approach/ Attitudes	<ul style="list-style-type: none"> <li>• Beliefs about the salient consequences of engaging in the behavior</li> </ul>	<ul style="list-style-type: none"> <li>• Measures include semantic differential scales and bi-polar scales unlikely-likely</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Quant:</b> ‘Meditating once a week is-good/bad’</li> <li>• <b>Qual:</b> ‘What good or bad things may happen’</li> </ul>	<ul style="list-style-type: none"> <li>• One quant measure with 5 scales</li> <li>• Two open-ended good/bad items</li> </ul>
(Fishbein & Ajzen, 2010)	Reasoned Action Approach/ Subjective Norm	<ul style="list-style-type: none"> <li>• Beliefs about what salient social referents think about engaging in the behavior</li> </ul>	<ul style="list-style-type: none"> <li>• Measures include semantic differential scales and bi-polar scales unlikely-likely</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Quant:</b> ‘Most people important to me think I should agree/ disagree’</li> <li>• <b>Qual:</b> ‘Who are the people approve/dis approve of you’</li> </ul>	<ul style="list-style-type: none"> <li>• Four quantitative measures</li> <li>• Two open-ended approve/disapprove items</li> </ul>
(Fishbein & Ajzen, 2010)	Reasoned Action Approach/ Perceived Behavior Control	<ul style="list-style-type: none"> <li>• Influenced by beliefs about the salient circumstances that facilitate or hinder the behavior</li> </ul>	<ul style="list-style-type: none"> <li>• Measures include semantic differential scales and bi-polar scales unlikely-likely</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Quant:</b> ‘How confident are you that you can meditate’</li> <li>• <b>Qual:</b> ‘What might make it easier/ harder for you’</li> </ul>	<ul style="list-style-type: none"> <li>• Four quant measures about control and confidence</li> <li>• Two open-ended easier/harder items</li> </ul>

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## **APPENDIX B: STUDY INFORMATION SHEET**

### **INDIANA UNIVERSITY STUDY INFORMATION SHEET**

#### **Adolescent Beliefs About Meditation**

You/your child are/is invited to participate in a research study on your/your child's thoughts and feelings about meditation and wellness. You/your child do/does not have to practice meditation to participate in this study. You/your child were/was selected as a possible subject because of your/your child's age and affiliation with your/your child's school district's health education course. We ask that you/your child read this form and ask any questions prior to agreeing to participate. The study is being conducted by Ryan G. Erbe, MS in the School of Public Health, Applied Health Science Department at Indiana University.

#### **STUDY PURPOSE**

The purpose of this study is to better understand the factors involved in why adolescents would choose or not choose to try meditation.

#### **PROCEDURES FOR THE STUDY**

If you/your child agree(s) to be in the study, you/your child will do the following things: Listen to an 8-minute instructional video about meditation and complete a questionnaire about your/your child's thoughts and feelings related to meditation practice and wellness. The questionnaire should take no more than 15 minutes to complete.

#### **CONFIDENTIALITY**

This study is both confidential and anonymous. Participant names and identifying information will not be asked and completed questionnaires will not be linked to individual participants in any way.

#### **PAYMENT**

No one will receive payment for taking part in this study. However, by participating in the study you/your child will be contributing valuable information that will ultimately enhance what is known about meditation and wellness.

#### **CONTACTS FOR QUESTIONS OR PROBLEMS**

For questions about the study, contact Ryan G. Erbe, MS at [rerbe@indiana.edu](mailto:rerbe@indiana.edu). For questions about your/your child's rights as a research participant or to discuss problems, complaints or concerns about a research study, or to obtain information, or offer input, contact the IU Human Subjects Office at (317) 278-3458 or (800) 696-2949.

#### **VOLUNTARY NATURE OF STUDY**

Taking part in this study is voluntary. You/your child may choose not to take part or may stop at any time. You/your child may also leave any question blank. Not taking part or not completing the study will not result in any penalty or loss of benefits to which you/your child is/are entitled. Your/your child's decision whether or not to participate in this study will not affect your/your child's class standing or current or future relations with the investigators or the School of Public Health at Indiana University.

## APPENDIX C: INSTRUMENT

**Directions:** This questionnaire asks about your thoughts and feelings related to you trying to meditate at least two times in the next week and also questions related to health and wellness. The questionnaire is voluntary and anonymous. There are no right or wrong answers.

For the purposes of this survey, meditation is defined as consisting of the following:

- Going to a quiet location with as few distractions as possible
- Sitting in a comfortable posture
- Focusing attention on a given point (sensations of the breath or a word/phrase)
- Having an open attitude (letting distractions come and go naturally without judging them)

**Part I:** Please tell us the things that come to your mind for each of the following questions. List **1-3 top-of-the-mind responses**. There are no right or wrong answers; just write what comes to your mind first.

1. I am willing to try to meditate at least twice in the next week:

- ☐ 1-Not at all true for me (1)
- ☐ 2 (2)
- ☐ 3 (3)
- ☐ 4 (4)
- ☐ 5-Really true for me (5)

2. How many days in the next week do you intend to meditate for a few minutes?

- ☐ 0
- ☐ 1
- ☐ 2
- ☐ 3
- ☐ 4
- ☐ 5
- ☐ 6
- ☐ 7

3. What one or two good things might happen to you if you meditate at least two times in the next week?

Good things:

4. What one or two bad things might happen if you meditate at least two times in the next week?

Bad things:

5. Who are the one or two people who might support trying to meditate?

Supportive people/group:

6. Who are the one or two people who might disapprove of you trying to meditate?

Disapproving people:

7. What are one or two things that might make it easier for you to meditate at least two times in the next week?

Easier:

8. What are one or two things that might make it harder for you to meditate at least two times in the next week?

Harder:

**PART II:** Please mark the part of the scale that best describes you.

9. When I'm sad, I can usually start doing something that will make me feel better.

- ☐ 1-Not at all true for me (1)
- ☐ 2 (2)
- ☐ 3 (3)
- ☐ 4 (4)
- ☐ 5-Really true for me (5)

10. If something isn't going according to my plans, I change my actions to try and reach my goal.

- ☐ 1-Not at all true for me (1)
- ☐ 2 (2)
- ☐ 3 (3)
- ☐ 4 (4)
- ☐ 5-Really true for me (5)

11. I can find ways to make myself study even when my friends want to go out.

- ☐ 1-Not at all true for me (1)
- ☐ 2 (2)
- ☐ 3 (3)
- ☐ 4 (4)
- ☐ 5-Really true for me (5)

12. When I'm bored I fidget or can't sit still.

- ☐ 1-Not at all true for me (1)
- ☐ 2 (2)
- ☐ 3 (3)
- ☐ 4 (4)
- ☐ 5-Really true for me (5)

13. I can usually act normal around everybody if I'm upset with someone.

- ☐ 1-Not at all true for me (1)
- ☐ 2 (2)
- ☐ 3 (3)
- ☐ 4 (4)
- ☐ 5-Really true for me (5)

14. I am good at keeping track of lots of things going on around me, even when I'm feeling stressed.

- ☐ 1-Not at all true for me (1)
- ☐ 2 (2)
- ☐ 3 (3)
- ☐ 4 (4)
- ☐ 5-Really true for me (5)

15. I can start a new task even if I'm tired.

- ☐ 1-Not at all true for me (1)
- ☐ 2 (2)
- ☐ 3 (3)
- ☐ 4 (4)
- ☐ 5-Really true for me (5)

16. I lose control whenever I don't get my way.

- ☐ 1-Not at all true for me (1)
- ☐ 2 (2)
- ☐ 3 (3)
- ☐ 4 (4)
- ☐ 5-Really true for me (5)

17. Little problems detract me from my long-term plans.

- ☐ 1-Not at all true for me (1)
- ☐ 2 (2)
- ☐ 3 (3)
- ☐ 4 (4)
- ☐ 5-Really true for me (5)



18. I forget about whatever else I need to do when I'm doing something really fun.

- ☐ 1-Not at all true for me (1)
- ☐ 2 (2)
- ☐ 3 (3)
- ☐ 4 (4)
- ☐ 5-Really true for me (5)

19. If I really want something, I have to have it right away.

- ☐ 1-Not at all true for me (1)
- ☐ 2 (2)
- ☐ 3 (3)
- ☐ 4 (4)
- ☐ 5-Really true for me (5)

20. During a dull class, I have trouble forcing myself to start paying attention.

- ☐ 1-Not at all true for me (1)
- ☐ 2 (2)
- ☐ 3 (3)
- ☐ 4 (4)
- ☐ 5-Really true for me (5)

21. After I'm interrupted or distracted, I can easily continue working where I left off.

- ☐ 1-Not at all true for me (1)
- ☐ 2 (2)
- ☐ 3 (3)
- ☐ 4 (4)
- ☐ 5-Really true for me (5)

22. If there are other things going on around me, I find it hard to keep my attention focused on whatever I'm doing.

- ☐ 1-Not at all true for me (1)
- ☐ 2 (2)
- ☐ 3 (3)
- ☐ 4 (4)
- ☐ 5-Really true for me (5)

23. I never know how much more work I have to do.

- ☐ 1-Not at all true for me (1)
- ☐ 2 (2)
- ☐ 3 (3)
- ☐ 4 (4)
- ☐ 5-Really true for me (5)

24. When I have a serious disagreement with someone, I can talk calmly about it without losing control.

- ☐ 1-Not at all true for me (1)
- ☐ 2 (2)
- ☐ 3 (3)
- ☐ 4 (4)
- ☐ 5-Really true for me (5)

25. It's hard to start making plans to deal with a big project or problem, especially when I'm feeling stressed.

- ☐ 1-Not at all true for me (1)
- ☐ 2 (2)
- ☐ 3 (3)
- ☐ 4 (4)
- ☐ 5-Really true for me (5)

26. I can calm myself down when I'm excited or all wound up.

- ☐ 1-Not at all true for me (1)
- ☐ 2 (2)
- ☐ 3 (3)
- ☐ 4 (4)
- ☐ 5-Really true for me (5)

27. I can stay focused on my work even when it's dull.

- ☐ 1-Not at all true for me (1)
- ☐ 2 (2)
- ☐ 3 (3)
- ☐ 4 (4)
- ☐ 5-Really true for me (5)

28. I can stop myself from doing things like throwing objects when I'm mad.

- ☐ 1-Not at all true for me (1)
- ☐ 2 (2)
- ☐ 3 (3)
- ☐ 4 (4)
- ☐ 5-Really true for me (5)

29. I work carefully when I know something will be tricky.

- ☐ 1-Not at all true for me (1)
- ☐ 2 (2)
- ☐ 3 (3)
- ☐ 4 (4)
- ☐ 5-Really true for me (5)

30. I am usually aware of my feelings before I let them out.

- ☐ 1-Not at all true for me (1)
- ☐ 2 (2)
- ☐ 3 (3)
- ☐ 4 (4)
- ☐ 5-Really true for me (5)

31. In class, I can concentrate on my work even if my friends are talking.

- ☐ 1-Not at all true for me (1)
- ☐ 2 (2)
- ☐ 3 (3)
- ☐ 4 (4)
- ☐ 5-Really true for me (5)

32. When I'm excited about reaching a goal (e.g., getting my driver's license, going to college), it's easy to start working toward it.

- ☐ 1-Not at all true for me (1)
- ☐ 2 (2)
- ☐ 3 (3)
- ☐ 4 (4)
- ☐ 5-Really true for me (5)

33. I can find a way to stick with my plans and goals, even when it's tough.

- ☐ 1-Not at all true for me (1)
- ☐ 2 (2)
- ☐ 3 (3)
- ☐ 4 (4)
- ☐ 5-Really true for me (5)

34. When I have a big project, I can keep working on it.

- ☐ 1-Not at all true for me (1)
- ☐ 2 (2)
- ☐ 3 (3)
- ☐ 4 (4)
- ☐ 5-Really true for me (5)

35. I can resist doing something when I know I shouldn't do it.

- ☐ 1-Not at all true for me (1)
- ☐ 2 (2)
- ☐ 3 (3)
- ☐ 4 (4)
- ☐ 5-Really true for me (5)

**Part III: Please mark the part of the scale that best describes what you think or feel about each statement.**

36. My trying to meditate at least two times in the next week is:

**Unlikely**                      o            o            o            o            o                      **Likely**

37. I will try to meditate at least two times in the next week:

- ☐ Strongly Agree
- ☐ Agree
- ☐ Neither
- ☐ Disagree
- ☐ Strongly Disagree

38. My trying to meditate at least two times in the next week is:

<b>Bad</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<b>Good</b>
<b>Unenjoyable</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<b>Enjoyable</b>
<b>Foolish</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<b>Wise</b>
<b>Boring</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<b>Fun</b>
<b>Unhelpful</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<b>Helpful</b>

39. Most people who are important to me think I should try to meditate at least twice in the next week:

- ☐ Strongly Agree
- ☐ Agree
- ☐ Neither
- ☐ Disagree
- ☐ Strongly Disagree

40. My friends and family think I should try to meditate at least twice in the next week:

- ☐ Strongly Agree
- ☐ Agree
- ☐ Neither
- ☐ Disagree
- ☐ Strongly Disagree

41. How many people similar to you meditate at least twice a week?

**Almost None**   ☐   ☐   ☐   ☐   ☐   **Virtually All**

42. Most people like me will try to meditate at least twice in the next week?

**Disagree**   ☐   ☐   ☐   ☐   ☐   **Agree**

43. My trying to meditate at least twice in the next week:

**Not under my control**   ☐   ☐   ☐   ☐   ☐   **Under my control**

44. My trying to meditate at least twice in the next week:

**Not up to me**   ☐   ☐   ☐   ☐   ☐   **Up to me**

45. How confident are you that you can try to meditate at least twice in the next week?

**Not at all Confident**   ☐   ☐   ☐   ☐   ☐   **Completely confident**

46. How sure are you that you can try to meditate at least twice in the next week?

**Not at all sure**   ☐   ☐   ☐   ☐   ☐   **Very sure**

**Part IV: Check the response that you believe is the best fit for you. Check only 1 response for each question.**

47. Have you ever tried to meditate?

- ☐ Yes
- ☐ No

48. How often do you usually meditate?

- ☐ Never
- ☐ Only for a class at school or other program
- ☐ A few times per year
- ☐ Once per month
- ☐ A few times a month
- ☐ 3-5 times per week
- ☐ 1-2 times per week
- ☐ Daily

49. How many times in the past 7 days did you meditate?

- ☐ 0
- ☐ 1
- ☐ 2
- ☐ 3
- ☐ 4
- ☐ 5
- ☐ 6
- ☐ 7
- ☐ 8+

50. What statement best describes your intention when it comes to meditating?

- ☐ I intend to continue my meditation practice in the next month
- ☐ I intend to stop my meditation practice in the next month
- ☐ I do not meditate now but I intend to start practicing meditation in the next month
- ☐ I do not meditate now but I might consider practicing meditation in the future
- ☐ I do not meditate now and I would not consider starting a meditation practice in the future

***If you engage in any type of meditation practice, please complete Part V below.  
If you NEVER meditate, please skip to Part VI on the next page.***

**Part V: The next questions ask you to describe your current meditation practice. If you NEVER meditate, please skip to Part V on the next page.**

51. In one sentence, describe what prompted you to begin meditating.
52. In one sentence, describe how did you learned to meditate.
53. In one sentence describe what place(s) you meditate.
54. In one sentence, describe if you meditate with other people. If so, who?

**Part VI: Check the response that you believe is the best fit for you. Check only 1 response for each question.**

55. What is your gender?

- ☐ Male
- ☐ Female

56. What is your age?

- ☐ 14
- ☐ 15
- ☐ 16
- ☐ 17
- ☐ 18

57. What is your race/ethnicity?

- ☐ White/Caucasian
- ☐ Black or African American
- ☐ Latino or Hispanic
- ☐ Asian or Asian American
- ☐ Multi-racial
- ☐ Other: please specify \_\_\_\_\_

58. Which of these best describes the adults who you are living with right now?

- ☐ My mother and father
- ☐ Just my mother
- ☐ Just my father
- ☐ My mother and my stepfather
- ☐ My father and my stepmother
- ☐ My Grandmother, Grandfather, or other relatives
- ☐ My foster parents

59. Did your mother graduate from college?

- ☐ No
- ☐ Yes
- ☐ I am not sure

60. Did your father graduate from college?

- ☐ No
- ☐ Yes
- ☐ I am not sure

62. Please write any other comments you may have about meditation in the space below:

***Thank you for your participation!***



## APPENDIX D: IRB APPROVAL DOCUMENT



### INDIANA UNIVERSITY

OFFICE OF THE VICE PRESIDENT FOR RESEARCH  
Office of Research Compliance

To: David Lohmann  
APPLIED HEALTH SCIENCE  
  
Ryan Erbe  
APPLIED HEALTH SCIENCE

From:

Human Subjects Office  
Office of Research Compliance – Indiana University

Date: September 15, 2016

RE: NOTICE OF EXEMPTION - NEW PROTOCOL

Protocol Title: Examining Adolescent Beliefs About Meditation: A Mixed Methods Study Using the Reasoned Action Approach

Study #: 1609327054

Funding Agency/Sponsor: None

Status: Exemption Granted | Exempt

Study Approval Date: September 15, 2016

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The Indiana University Institutional Review Board (IRB) EXE000001 | Exempt recently reviewed the above-referenced protocol. In compliance with (as applicable) 45 CFR 46.109 (d) and IU Standard Operating Procedures (SOPs) for Research Involving Human Subjects, this letter serves as written notification of the IRB's determination.

Under 45 CFR 46.101(b) and the SOPs, as applicable, the study is accepted as Exempt (710) Category 7 Flex: Research that is not federally funded or otherwise federally regulated and is on individual or group characteristics or behavior (including, but not limited to, research on perception, cognition, motivation, identity, language, communication, cultural beliefs or practices, and social behavior) or employs survey, interview, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies, with the following determinations:

Acceptance of this study is based on your agreement to abide by the policies and procedures of the Indiana University Human Research Protection Program and does not replace any other approvals that may be required. Relevant policies and procedures governing Human Subjects Research can be found at: [http://researchcompliance.iu.edu/hso/hs\\_guidance.html](http://researchcompliance.iu.edu/hso/hs_guidance.html).

The Exempt determination is valid indefinitely. Substantive changes to approved exempt research must be requested and approved prior to their initiation. Investigators may request proposed changes by submitting an amendment through the KC IRB system. The changes are reviewed to ensure that they do not affect the exempt status of the research. Please check with the Human Subjects Office to determine if any additional review may be needed.

You should retain a copy of this letter and all associated approved study documents for your records. Please refer to the assigned study number and exact study title in future correspondence with our office. Additional information is available on our website at <http://researchcompliance.iu.edu/hso/index.html>.

**If your source of funding changes, you must submit an amendment to update your study documents immediately.**

If you have any questions or require further information, please contact the Human Subjects Office via email at [irb@iu.edu](mailto:irb@iu.edu) or by phone at 317-274-8289 (Indianapolis) or 812-856-4242 (Bloomington).

You are invited, as part of ORA's ongoing program of quality improvement, to participate in a short survey to assess your experience and satisfaction with the IRB related to this approval. We estimate it will take you approximately 5 minutes to complete the survey. The survey is housed on a Microsoft SharePoint secure site that requires CAS authentication. This survey is being administered by REEP; please contact us at [reep@iu.edu](mailto:reep@iu.edu) if you have any questions or require additional information. Simply click on the link below, or copy and paste the entire URL into your browser to access the survey: [https://www.sharepoint.iu.edu/sites/iu-ora/survey/Lists/Compliance/IRB\\_Survey/NewForm.aspx](https://www.sharepoint.iu.edu/sites/iu-ora/survey/Lists/Compliance/IRB_Survey/NewForm.aspx).

/enclosures

## APPENDIX E: SCHOOL APPROVAL LETTER

Fw: Meditation Study

Kelly Breward <BrewardK@binghamtonschools.org>

Sat 10/8/2016 8:59 AM

To: Erbe, Ryan Gerald <rerbe@indiana.edu>;

Great news! We will have to touch base next week.

Kelly

---

**From:** Tonia Thompson

**Sent:** Thursday, October 6, 2016 11:44 AM

**To:** Kelly Breward; David Garbarino

**Subject:** RE: Meditation Study

Kelly,

The study looks like a valuable resource in supporting the Health Curriculum in the district.

I just have one request. Whenever we give a survey or involve our students at any level in the district, we make it clear that they have the option of not participating.

There were no attachments to the IRB, but usually a letter to parents or students is written, clearly articulating that option, purpose of the study and that no identifying information will be published or shared as associated with the participants of the study.

Can you check in with Ryan to be sure this is included, and if not, communicate it in writing to the parents, letting them know to contact you if they do not want them participating and then make sure it is minimally stated to the students before the survey is offered?

Thanks!

Tonia

## APPENDIX F: GRADUATE SCHOOL GRANT LETTER



December 22, 2016

Ryan Erbe  
Department of Applied Health Science  
Indiana University, Bloomington

Re: Grant-in-Aid of Doctoral Research Award

Dear Ryan,

I am pleased to inform you that you have been awarded a Grant-in-Aid of Doctoral Research Award. The amount of your award is \$500. The University Graduate School offers this support to help cover unusual expenses incurred in connection with your doctoral research. Please note that, as stipulated in the guidelines, any equipment purchased with these funds will remain with the department after completion of the research.

Your award will be posted to your Bursar account within the next 30 days. If you have any questions or if your award isn't reflected on your account, please contact the Graduate Fellowships & Awards Coordinator at [ugsawrd@indiana.edu](mailto:ugsawrd@indiana.edu).

The University Graduate School will be hosting an awards reception on Friday, April 28<sup>th</sup> from 4:00-6:00 pm in the Indiana Memorial Union Frangipani Room to acknowledge all students who received an award or fellowship from the Graduate School this year, including the Grant-in-Aid. Emily Winters, the Graduate Fellowships & Awards Coordinator, will be corresponding with you in the months to come about the details of this event.

Please accept my congratulations and best wishes for continued success in your graduate studies. Indiana University will be most proud to see you complete the requirements for your degree.

Sincerely,

David L. Daleke  
*Vice Provost for Graduate Education and Health Sciences*  
*Associate Dean, The University Graduate School*

CC: Terra Hay, Scheduling/Graduate Studies Specialist  
Jon Macy, Associate Professor  
Dave Lohrman, Professor and Chair, Applied Health Science  
Susan E. Middlestadt, Professor and Director of Graduate Education

The University Graduate School  
Wells Library / 1320 E. 10<sup>th</sup> Street, Room E546 / Bloomington, IN 47405  
812-855-8853

## APPENDIX G: SCHOOL OF PUBLIC HEALTH GRANT LETTER



### SCHOOL OF PUBLIC HEALTH

INDIANA UNIVERSITY  
Bloomington

December 6, 2015

Ryan Erbe  
School of Public Health – Bloomington  
Indiana University

Dear Ryan Erbe:

It gives us great pleasure to announce that you have been awarded a School of Public Health Student Research Grant in the amount of \$500.00 by the SPH – Bloomington Research and Creativity Committee for your study entitled: *Examining adolescents beliefs about meditation: A mixed methods study using the reasoned action approach*.

The award will be transferred to your bursar account shortly.

We ask that you complete a Follow-Up Form at the conclusion of your research project and submit it directly to Jacque Whaley.

If you have questions regarding reimbursement, please feel free to contact Ms. Whaley (whaley@indiana.edu).

Again, congratulations on your Student Research Grant.

Sincerely,

Dr. Jennifer Piatt  
Chair, SPH – Bloomington Research Committee

## APPENDIX H: CODING MANUAL

### Adolescent Beliefs About Meditation Coding Manual - ADVANTAGES

<b>Interrater Code</b>	<b>Category</b>	<b>Name For Good Things</b>	<b>SPSS Code</b>	<b>Examples</b>
<b>1</b>	<b>Will make me less stressed</b>	Will relieve my stress	AD01	Less stressed Stress relief
<b>2</b>	<b>Will make me relaxed AD13</b>	Will give me peace	AD02	I'll be peaceful Have a piece of mind
		Will make me calm	AD03	Being calm
		Will help me relax	AD04	Feel relaxed
<b>3</b>	<b>Will make me more focused AD14</b>	Will help me focus	AD05	Better focus
		Will help me concentrate	AD06	Better concentration
		Will increase my attention	AD07	Increase in attention
		Will help clear my mind	AD08	Clear my thoughts
<b>4</b>	<b>Positive</b>	Will make me more positive	AD09	Positive attitude Less attitude Good thinking Better decisions
<b>5</b>	<b>Other AD15</b>	Unsure	AD10	Not sure I don't know
		Nothing	AD11	Nothing
		Other	AD 12	Tired Reconnect with yourself Enlightenment

**Adolescent Beliefs About Meditation  
Coding Manual – Bad Things**

<b>I.R. Code</b>	<b>Category</b>	<b>Name for Bad Things</b>	<b>SPSS Code</b>	<b>Examples</b>
<b>6</b>	<b>Time DS21</b>	Waste of time	DS01	Waste of time
		Losing time	DS02	Loss of time
		Takes time	DS03	Takes up time Time consuming
		No time	DS04	Don't have time
<b>7</b>	<b>No negatives</b>	Nothing	DS05	Nothing None
<b>8</b>	<b>Lose focus</b>	Will lose focus	DS06	Lose focus Mind might wander
<b>9</b>	<b>Cause stress DS22</b>	Will not be able to relax	DS07	Having a war with yourself
		Will cause too much thinking	DS08	I would lose my thoughts
		Will cause stress	DS09	Stress
		Will not help emotionally	DS10	Loss of patience
<b>9</b>	<b>Failure DS23</b>	Will not work	DS11	Might not work Still reckless with my mouth Won't help me calm myself
		Will be unenjoyable	DS12	I might not want to do it
		Will forget to do it	DS13	I might forget to meditate
<b>10</b>	<b>Too Slow DS24</b>	Will fall asleep	DS14	I might fall asleep
		Will get bored	DS15	Might get bored
		Will become too laid back	DS16	Become too laid back
<b>11</b>	<b>Other DS25</b>	Will get made fun of	DS17	People making fun of you
		Will become demon possessed	DS18	Demon possession
		Unsure	DS19	Idk
		Other	DS20	Space

**Adolescent Beliefs About Meditation  
Coding Manual – SUPPORTERS**

<b>I.R. Code</b>	<b>Category</b>	<b>Name for Supporter</b>	<b>SPSS Code</b>	<b>Examples</b>
<b>11</b>	<b>Family  AP17</b>	Both Parents	AP01	Parents Dad and mom
		Mom	AP02	Mom
		Dad	AP03	My dad
		Sister	AP04	My sister
		Grandparents	AP05	Grandma
		Other Family	AP06	Aunt
<b>12</b>	<b>Friends  AP18</b>	Friends	AP07	My friends
		Boyfriend	AP08	My boyfriend
<b>13</b>	<b>Peers</b>	Peers	AP09	-
<b>14</b>	<b>Haters</b>	Haters	AP10	-
<b>15</b>	<b>School Personnel  AP19</b>	Teacher	AP11	Teacher Mrs. Brewer/Beward Ms. Hampton
		Coach	AP12	Coach
<b>16</b>	<b>Myself</b>	Myself	AP13	Myself
<b>17</b>	<b>No One</b>	No one	AP14	Nothing No one
<b>18</b>	<b>Other  AP20</b>	Unsure	AP15	I have no idea
		Other	AP16	Everyone Iris Christian



**Adolescent Beliefs About Meditation  
Coding Manual – DISAPPROVERS**

<b>I.R. Code</b>	<b>Category</b>	<b>Name for Supporter</b>	<b>SPSS Code</b>	<b>Examples</b>
<b>19</b>	<b>Family DP17</b>	Both Parents	DP01	Parents Dad and mom
		Mom	DP02	Mom
		Dad	DP03	My dad
		Sister	DP04	My sister
		Grandparents	DP05	Grandma
		Other Family	DP06	Whole family
<b>20</b>	<b>Friends DP18</b>	Friends	DP07	My friends
		Boyfriend	DP08	-
<b>21</b>	<b>Peers</b>	Peers	DP09	Peers Classmates
<b>22</b>	<b>Haters</b>	Haters	DP10	Haters Enemies
<b>23</b>	<b>School Personnel DP19</b>	Teacher	DP11	Teachers School
		Coach	DP12	-
<b>24</b>	<b>Myself</b>	Myself	DP13	Me Myself
<b>25</b>	<b>No One</b>	No one	DP14	No one Nobody
<b>26</b>	<b>Other DP20</b>	Unsure	DP15	I have no idea
		Other	DP16	Everyone Jon

**Adolescent Beliefs About Meditation  
Coding Manual - EASIER**

<b>I.R. Code</b>	<b>Category</b>	<b>Name for Easier</b>	<b>SPSS Code</b>	<b>Examples</b>
<b>27</b>	<b>Time EA15</b>	More time/Free time	EA01	Free time More time
		Less school/activities	EA02	No homework Not having school
		Scheduling time	EA03	Keeping a schedule Schedule A reminder
<b>28</b>	<b>Distractions EA16</b>	Alone	EA04	To get away from people Going somewhere where no one is around
		Quiet place	EA05	Quiet place Quiet environment
		Place	EA06	Finding a place to do it Space
		Relaxing	EA07	Relaxing To lose ADHD Slowing down
<b>29</b>	<b>Other Enabling Factors EA 17</b>	Supportive others	EA08	Support from loved ones Have a friend do it also
		Music	EA09	Music makes me feel different Relaxing music
		Posture	EA10	Being comfortable Lay down Yoga
		Motivation	EA11	Motivation Telling myself
<b>30</b>	<b>Other EA18</b>	Nothing	EA12	Nothing None
		Unsure	EA13	Don't know Idk
		Other	EA14	Some way not to fall asleep Don't think about what will happen

**Adolescent Beliefs About Meditation  
Coding Manual - HARDER**

<b>I.R. Code</b>	<b>Category</b>	<b>Name for Harder</b>	<b>SPSS Code</b>	<b>Examples</b>
<b>31</b>	<b>Time HD14</b>	Time/Busy	HD01	Being busy No time
		School/HW	HD02	Homework School
		Sport	HD03	Practice Recreational activities
		Work/Job	HD04	Work A job
<b>32</b>	<b>Distractions HD 15</b>	Noise	HD05	Noise Loud people
		Other Distractions	HD06	Distractions School work at the back of my mind
		People	HD07	Being able to be alone Pets and family
		Emotional Issue	HD08	ASHS, OCD High anxiety Anger
<b>33</b>	<b>Other Enabling Factors HD 16</b>	Lack of motivation	HD09	Lack of care Laziness
		Forgetting	HD10	Forgetting Not remembering
<b>34</b>	<b>Other HD17</b>	Nothing	HD11	Nothing
		Unsure	HD12	I don't know
		Other	HD13	If I wasn't so exhausted all the time It can be sinful It doesn't work

## **APPENDIX I: DEFENSE SUPPLEMENTAL HANDOUT**

### **Conceptualizing Reasoned Action Approach Constructs**

#### **1. Conceptual definitions of the three components of the RAA (Fishbein & Ajzen, 2010):**

Attitude: Evaluations about a behavior as being positive or negative (instrumental) and/or enjoyable or unenjoyable (experiential).

Perceived Norm: Perceptions about whether others think one should engage in the behavior or not (injunctive norm) and whether or not those that are considered similar engage in the behavior (descriptive norm).

Perceived Behavioral Control: Perceptions about whether or not executing the behavior is under their control or up to them (autonomy) and their self-efficacy or confidence in their ability to perform the behavior (capacity).

#### **2. Use of the phrase “socially normative activity/behavior” in ‘Discussion’:**

I incorrectly worded my conclusions/findings. I would say that intending to try meditating at least twice in the next week is based on participants perceiving that important referents would approve of them performing the behavior and whether or not others like them perform the behavior.

### **Conceptual definitions of ‘control’ variables, namely Self-Regulation**

#### **3. What type of variable is self-regulation:**

Should be a control variable not a demographic variable. It is an ability and skill. The measure is about their perception of their ability to self-regulate in certain situations.

Self-Regulation as defined in the Adolescent Self-Regulation Inventory (ASRI)- “Self-regulation is the ability to flexibly activate, monitor, inhibit, persevere and/or adapt one’s behavior, attention, emotions and cognitive strategies in response to direction from internal cues, environmental stimuli and feedback from others, in an attempt to attain personally-relevant goals” (Moilanen, 2007, p. 835).

“Teenagers should be capable of regulating their thoughts, feelings, attention and behavior in a planful, goal-oriented way” (Moilanen, 2007, p. 836).

“This measure taps teenagers’ self-regulatory success or failure through the inclusion of 5 components (monitoring, activating, adapting, persevering and inhibiting), 4 domains (emotional, behavioral, attentional and cognitive), and 2 temporal contexts (i.e., long and short-term) of self-regulation” (Moilanen, 2007, p. 846).

#### 4. What is the logic of using self-regulation as a control variable?

I measure PBC which is behavior specific. Since self-regulation is an important developmental construct, I wanted to see if their perceptions about their ability to self-regulate globally had an impact on their intention to try a difficult health behavior. This could be considered an external variable in RAA (other individual differences).

#### 5. Further support of the conclusion that PBC is not relevant to trying meditation:

**TABLE 3.1 Associations of Intention to Meditate At least Twice During the Next Week (N=115)**

Predictor Variable	t	B	SE B	$\beta$	p
ATT	7.18***	.510	.071	.549	.000
PN	4.19***	.346	.083	.290	.000
PBC	1.39	.098	.071	.108	.167

Note.  $R^2 = .728$

\*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$

**TABLE 3.2 Associations of Intention to Meditate At least Twice During the Next Week (N=115)**

Predictor Variable	t	B	SE B	$\beta$	p
ATT	6.93***	.511	.074	.550	.000
PN	3.99***	.337	.084	.282	.000
PBC	1.37	.104	.076	.114	.174
Sex	-1.43	-.151	.106	-.074	.155
Age	0.61	.041	.068	.031	.544
Race	0.35	.004	.107	.002	.972
Family Structure	0.07	.008	.114	.004	.944
Parent Education	1.04	.117	.113	.056	.300

Note.  $R^2 = .737$

\*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$

#### Mixed-Methods Research

#### 6. The open-ended questions to identify salient beliefs as qualitative inquiry:

A thematic analysis is a research technique used in qualitative inquiry. Although the survey asked semi-structured questions, it still elicited responses that were not predetermined or quantified. Some responses were words but others were sentences which forced me to make judgments about meaning; another indicator of qualitative research. On the spectrum of qualitative research, it may not be at the same end as phenomenology but it is still qualitative and can be used together with the results of the quantitative study.

## 7. Definition (with a reference to the literature) of mixed-methods research:

Deliberately designing a study to use quantitative and qualitative methods, both of which are needed to address the research question(s) of interest (Yin, 2016). Page 337

Research approach that combines both quantitative and qualitative research techniques (Remler & Van Ryzin, 2015). Page 83

Although qualitative and quantitative methods tend to be viewed as distinct categories, in the actual practice of social research, they often overlap. **Sometimes, the analysis of qualitative interviews or observations, for example, involve counting words or behaviors.** Qualitative analysis software for content analysis can be used in this way. And coded qualitative data can be analyzed quantitatively using a variety of methods (Remler & Van Ryzin, 2015). Page 83

## 8. Which of the many types of mixed-methods designs is this?

Mixed methods research is still emerging as a distinct and unique craft. Mixed methods research primarily provides an opportunity for bringing two or more methods together in the same study. This has also been called an opportunity to deal with the ‘**multiplism of methods**’ (Bazeley, 2012). **In this arrangement, a mixed methods study supports the coexistence of complementary methods, but each method still follows its own procedures, and the study more or less mechanically combines them-albeit in some meaningful way (e.g., by using parallel or sequential designs). However, it is important to note that no actual integration or blending takes place between the methods** (Bazeley & Kemp, 2012; Yin, 2016).

## 9. How findings from the two studies would be integrated:

The RAA suggests that the three main constructs (as measured in the quantitative study) are determined by an individual’s beliefs the salient outcomes or attributes of performing the behavior (ATT), a person’s beliefs about what salient social referents think (PN), and a person’s beliefs about the salient circumstances that either facilitate or hinder the behavior (PBC) (as measured in the qualitative study). Therefore, to integrate the findings I would talk about the belief structure that underlies the two constructs that had statistically significant regression weights on INT.

## References

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# RYAN G. ERBE

## EDUCATION

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- Ph.D.** **Indiana University**, Bloomington, IN Department of Applied Health Science June 2017  
**Dissertation:** “Examining Adolescents’ Beliefs About Meditation”
- M.S.** **Ball State University**, Muncie, IN Department of Physiology and Health Science 2005  
**Thesis:** “Spirituality and its Relationship to Alcohol Use Among College Students”
- B.S.** **Ithaca College**, Ithaca, NY Department of Health Promotion/Human Movement 2003  
**Major:** Health and Physical Education (K-12) Teacher Certification

## CERTIFICATIONS

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New York State Permanent Teaching Certification for Health and Physical Education, Certificate Number 558249

## RESEARCH EXPERIENCE

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**School Health Policies and Programs Study (SHPPS)** 2006  
**Centers for Disease Control and Prevention (CDC)**

*Opinion Research Corporation*

- Worked as a data collector for the School Health Policies and Programs Study 2006 research project
- Interviewed school administrators, mental health professionals, physical educators, and health educators
- Utilized data collection software

## RESEARCH PEER-REVIEWED PUBLICATIONS

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Jayawardene, W. T, Lohrmann, D. K., **Erbe, R. G.**, Torabi, M. R. (2017). Effects of preventive online mindfulness interventions on stress and mindfulness: A meta-analysis of randomized controlled trials. *Preventive Medicine Reports*, 5, 150-159.

Jayawardene, W. T, **Erbe, R. G.** (2017). Use of treatment and counseling services and mind-body techniques by students with emotional and behavioral difficulties. *Journal of School Health*, 87(2), 133-141.

**Erbe, R. G.**, & Lohrmann, D. K. (2016). Mindfulness meditation for adolescent stress and well-being: A systematic review of the literature with implications for school health programs. *Health Educator*, 47(2), 12-19.

**Erbe, R.** (2005). Spirituality: A missing dimension in health education. *Health Education Student Monograph Series*, 22, 12-16.



## RESEARCH PRESENTATIONS

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### National

Lederer, A. M, **Erbe, R. G.** (2016). Meanings of meditation: Implications for researchers and practitioners. American Public Health Association (APHA) Annual Meeting, Oral Presentation, Denver, CO.

**Erbe, R. G., & Lin, H-S.** (2016). Examining the determinants of mind-body practices for youth: The role of parental influence through observational learning. American School Health Association (ASHA) National Conference, Research and Emerging Issues Presentation, Baltimore, MD.

**Erbe, R. G.** (2016). Meditation to promote adolescent self-regulation: Emerging findings and practical strategies for health educators. Society of Health and Physical Educators (SHAPE), Webinar.

**Erbe, R. G.** (2015). Stories as psychologically privileged: Using story structure for course and lesson design in health. American School Health Association (ASHA) National Conference, Teaching and Learning Presentation, Orlando, FL.

**Erbe, R. G., & Seabert, D.** (2006). Spirituality and its relationship to alcohol use among college students. American Alliance for Health, Physical Education and Dance (AAHPERD) National Convention, Poster Presentation, Salt Lake City, UT.

Santabarbara, T, Seabert, D., & **Erbe, R. G.** (2005). Pre-service teachers' attitudes toward role modeling health behaviors compared to their actual health behaviors. American School Health Association (ASHA) National Conference, Poster Presentation, Burbank, CA.

## GRANTS

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<b>School of Public Health Student Travel Grant Award, Recipient</b>	2014-2016
<b>Grant-in-Aid of Doctoral Research Award, Recipient</b>	2016
<b>School of Public Health Student Research Grant, Recipient</b>	2016

## TEACHING EXPERIENCE

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**Associate Instructor-** Indiana University, Department of Applied Health Science 2014-Present  
*Bloomington, IN*

- Courses taught included Secondary School Health Curriculum and Strategies (Current), Secondary School Health Instruction and Assessment, Coordinated School Health Programs (2 semesters), Introduction to Health Education (2 summers), Personal Health (2 semesters), and Men's Health (1 summer)
- Created and implemented health lessons, fostered a positive learning environment, employed effective teaching methods, and graded papers and exams
- Incorporated various innovative teaching techniques including the use of novel technologies for education

**Health Education Teacher-** Clarkstown South High School/Clarkstown Schools 2010-2014  
*West Nyack, NY*

- Taught a health education course for primarily 10<sup>th</sup> graders and a senior elective course entitled 'Critical Health Issues'
- Created and implemented creative, engaging, skills-based teaching strategies, and assessed each student in these classes
- Maintained a positive and nurturing learning environment for all students
- Other roles included junior and senior class adviser, Wellness Committee member, 'Health Advocates' adviser, and new principal hiring committee for the 2013-2014 school year
- Created and implemented a 'Drug Awareness' workshop for parents and a farmer's market for community members
- Completely revised and implemented the high school health curriculum from content focused to skills-based

**Health Education Teacher-** Felix Festa Middle School/Clarkstown Schools 2006-2010  
*West Nyack, NY*

- Taught health education for students in grades 6, 7 and 8
- Created and implemented creative, engaging, skills-based teaching strategies, and assessed each student in these classes
- Maintained a positive and nurturing learning environment for all students
- Other roles included the Tobacco-Free Schools Policy Committee Liaison, Alternative Activities Coordinator, Bullying Prevention staff development day presenter, father/son puberty workshops facilitator, teaching assistant workshop presenter, Drug-Free Schools Task Force committee member, and Bullying Prevention committee member

**Health Science Contract Faculty-** Ball State University Summer 2006  
*Muncie, IN*

- Taught one section of 'Coordinated School Health Programs in Elementary Schools'
- Implemented creative teaching strategies and handled all grading and assessment

**Health Education Long-Term Substitute Teacher-** Vestal High School Fall 2005  
*Vestal, NY*

- Taught health education to high school students grades 9-12
- Created and implemented unit plans, used effective classroom management skills and teaching strategies
- Handled all grading, involved with parent-teacher conferences, and worked lunchtime supervision

**Health Education Teacher-** Broome-Tioga BOCES 2004-2006  
*Binghamton, NY; Chenango Bridge, NY*

- Taught summer school health education to high school students grades 9-12
- Designed, created and implemented lesson and unit plans
- Enforced a positive learning environment, and used effective teaching methods

**Graduate Assistant-** Ball State University, Department of Physiology/Health Science 2004-2005  
*Muncie, IN*

- Assisted with teaching two sections of the ‘Elementary School Health Program’ course for undergraduate
- Graded papers, created and implemented health lessons, fostered a positive learning environment, and employed effective teaching methods
- Analyzed, interpreted, and presented findings regarding Batesville School Corporation, Batesville, Indiana, students’ alcohol, tobacco, and other drug-use data

## **TEACHING PEER-REVIEWED PUBLICATIONS**

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**Erbe, R.** (2014). Puzzle vision. *Journal of Health Education Teaching Techniques*, 1, 1-12.

Santabarbara, T., **Erbe, R.**, & Cooper, S. (2009). Relationship building blocks. *Journal of School Health*, 79, 505-509.

**Erbe, R.** (2007). Me puzzle: Spiritual decision-making. *American Journal of Health Education*, 38, 304-307.

## **TEACHING PRESENTATIONS**

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### **National**

**Erbe, R. G.** (2016). The mindful classroom: Teaching mindfulness meditation to promote adolescent self-regulation. American School Health Association (ASHA) National Conference, Teaching and Learning Presentation, Baltimore, MD.

**Erbe, R. G.** (2015). 7 habits of highly healthy teens. Society of Health and Physical Educators (SHAPE), Webinar.

**Erbe, R. G.** (2014). 7 habits of highly healthy teens. American School Health Association (ASHA) National Conference, Teaching Technique Presentation, Portland, OR.

**Erbe, R. G.** (2014). Puzzle vision. American Alliance for Health, Physical Education, Recreation and Dance (AAHPERD) National Convention, Teaching Technique Presentation, St. Louis, MO.

**Erbe, R. G.** (2013). Puzzle vision: Decision-making and Paradigm shift: From a content driven to a skills focused curriculum. American School Health Association (ASHA) National Conference, Teaching Technique and Poster Presentation, Myrtle Beach, SC.

Santabarbara, T., & **Erbe, R. G.** (2008). Building blocks of a healthy relationship, and Birds and the bees: Puberty workshop. American School Health Association (ASHA) National Conference Concurrent and Roundtable Sessions, Tampa, FL.

### **Regional**

**Erbe, R. G.**, & Scott, J. (2016). Creating and sustaining inclusive learning spaces. Center for Innovative Teaching and Learning (CITL) Associate Instructor Workshop, Indiana University, Bloomington, IN.

**Erbe, R. G.** (2016). Meditation for promoting self-regulation in adolescence: Research, implications, and practical strategies for school health professionals. Indiana School Health Network Annual School Health Conference, Indianapolis, IN.

**Erbe, R. G.** (2016). The privileged status of story: Using story structure in course and lesson design for engagement. E. C. Moore Symposium Workshop, Indiana University-Purdue University Indianapolis, Indianapolis, IN.

Kearns, K., & **Erbe, R. G.** (2016). The power of stories for teaching: Using story structure for lesson planning in a university setting. Center for Innovative Teaching and Learning (CITL) Workshop, Indiana University, Bloomington, IN.

Cooper, S., & **Erbe, R. G.** (2012). Hyped up teaching strategies: Middle school-high school connection. Adelphi University HealthNets Conference, Conference Presentation, Garden City, NY.

**Erbe, R. G.** (2007). Spirituality and health: Making the connection. New York Association for Health, Physical Education, Recreation and Dance's (NYSAHPERD) State Convention, Conference Presentation, Verona, NY.

Clemente, D., & **Erbe, R. G.** (2007). Let's talk about sex. Adelphi University HealthNets Conference, Conference Presentation, Garden City, NY.

### **Guest Speaking**

**Erbe, R. G.** (2017). Examining adolescent beliefs about meditation. Statistical Consulting, S490/690, Indiana University, Bloomington, IN.

**Erbe, R. G.** (2015, 2016). 7 habits of highly healthy teens. Secondary School Health Curriculum and Strategies, H352, Indiana University, Bloomington, IN.

**Erbe, R. G.** (2015). Meditation for health. Personal Health, H263, Indiana University, Bloomington, IN.

**Erbe, R. G.** (2014; 2015). 7 habits of highly healthy teens. Secondary School Health Curriculum and Instruction, H352, Indiana University Purdue University Indianapolis (IUPUI), Indianapolis, IN.

## **PROFESSIONAL SERVICE**

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**Conversations in Science at Indiana University**, Blogger 2017-Present

- Conceptualize and write research posts for a scientific blog at Indiana University

**Indiana State Health Education Standards Revision Committee**, Member 2016-Present

- Serve on a committee responsible for revising Indiana State Health Education Standards
- Attend and participate in meetings with colleagues to discuss potential revisions

**Indiana University College and School Health Committee**, Member 2016-Present

- Serve on a committee responsible for curriculum decisions regarding school/college health programs
- Participate in and contribute to meetings once per month during the academic year

- American School Health Association Research Committee, Member** 2016-Present
- Help guide the direction of research and the Journal of School Health for the American School Health Association
  - Participate in and contribute to conference calls once per month
- American School Health Association Future Leaders Academy, Member** 2016-Present
- Selected to participate in a group of emerging professionals being trained for leadership roles in school health
  - Participate and contribute to conference calls once per month
- Monroe County Community School Corporation Health Council, Member** 2015-Present
- Member of the coordinated school health council responsible for new initiatives related to school health school corporation
  - Participate in and contribute to quarterly meetings
- Journal of School Health, Research Reviewer** 2015-Present
- Review research manuscripts submitted to the Journal of School Health
- American School Health Association, National Conference Reviewer** 2014-Present
- Evaluate conference proposals for the American School Health Association's National Conference
- Journal of School Health, Teaching Techniques Reviewer** 2008-2011
- Reviewed teaching technique manuscripts submitted to the Journal of School Health

## **PROFESSIONAL AFFILIATIONS**

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- Society for Research on Adolescence, Member** 2015-Present
- Eta Sigma Gamma National Health Education Honorary, Member** 2014-Present
- Society for Public Health Education, Member** 2014-Present
- American School Health Association, Member** 2005-Present
- American Alliance for Health Physical Education Recreation Dance, Member** 2003-Present

## **AWARDS**

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- Delta Omega National Public Health Honorary Gamma Beta Chapter Inductee** 2017
- Society of Public Health Education Delbert Oberteuffer Scholarship, Recipient** 2017
- Indiana University Bloomington Three Minute Thesis Competition, Second Place** 2017
- School of Public Health Graduate Research Fellowship Award, Recipient** 2015, 2016
- American School Health Association Student Scholarship, Recipient** 2015
- Elizabeth A. Neilson and George H. Neilson Scholarship, Recipient** 2005

## **VOLUNTEER SERVICE**

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- Teen Ministry, Indianapolis Church of Christ, Ministry Assistant** 2014-Present
- Teen Ministry, Hudson Valley Church of Christ, Ministry Leader** 2008-2014